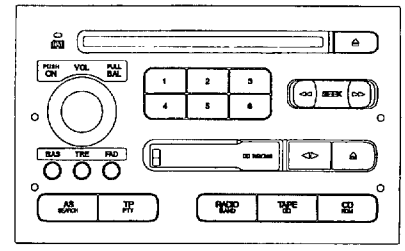
Service Manual

PIONEER®
The Art of Entertainment
SAAB



ORDER NO.
CRT1905

HEAD UNIT(3 in 1)

FX-M2016ZSA EW

COMPACT disc DIGITAL AUDIO

VEHICLE	DESTINATION	PRODUCED AFTER	PART No.	PIONEER MODEL No.
SAAB9000	EUROPE	1997	4616868	FX-M2016ZSA/EW

NOTE:

- **See the service manual CX-597(CRT1811) for the CD mechanism description, disassembly and circuit description.**
- **The CD mechanism employed in this model is one of CX-844 series.**
- **Dolby noise reduction manufactured under license from Dolby Laboratories Licensing Corporation. "Dolby" and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.**
- **See the separate manual CX-631(CRT1640) for the cassette mechanism description.**
- **The cassette mechanism assy employed in this model is one of X-2L series**
- **How to cancel the security system for service.**
  To cancel the security function, turn on the back-up power while pressing the Tape eject button and the Power button (Volume knob) at the same time. To re-activate the security system, turnoff the power (or the back-up power).

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1. SAFETY INFORMATION

● CD Player Service Precautions

1. For pickup unit(CXX1230) handling,please refer to"Disassembly"(CX-597 Service Manual CRT1811). During replacement,handling precautions shall be taken to prevent an electrostatic discharge(protection by a short pin).
2. During disassembly,be sure to turn the power off since an internal IC might be destroyed when a connector is plugged or unplugged.

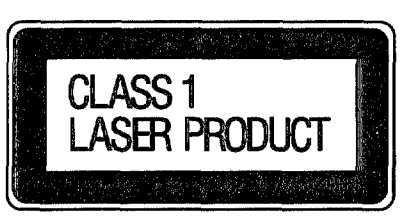
● Safety Precautions for those who Service this Unit.

When checking or adjusting the emitting power of the laser diode exercise caution in order to get safe, reliable results.

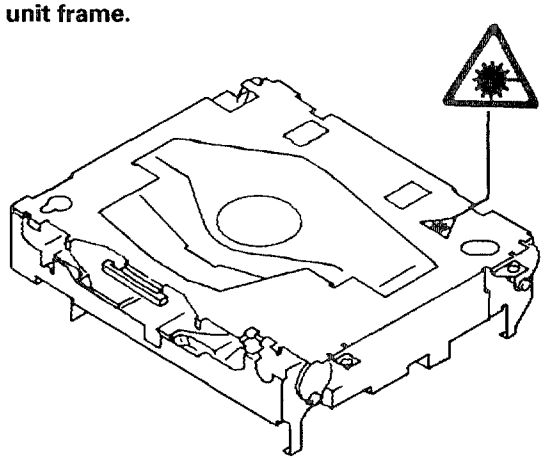
Caution:

1. During repair or tests, minimum distance of 13cm from the focus lens must be kept.
2. During repair or tests, do not view laser beam for 10 seconds or longer.

2. A "CLASS 1 LASER PRODUCT" label is affixed to the rear of the player.



3. The triangular label is attached to the mechanism unit frame.



4. Specifications of Laser Diode

Specifications of laser radiation fields to which human access is possible during service.
Wavelength = 785 nanometers
Radiant power = 69.7 microwatts(Through a circular aperture stop having a diameter of 80 millimeters)
0.55 microwatts(Through a circular aperture stop having a diameter of 7 millimeters)

2. EXPLODED VIEWS AND PARTS LIST

2.1 PACKING

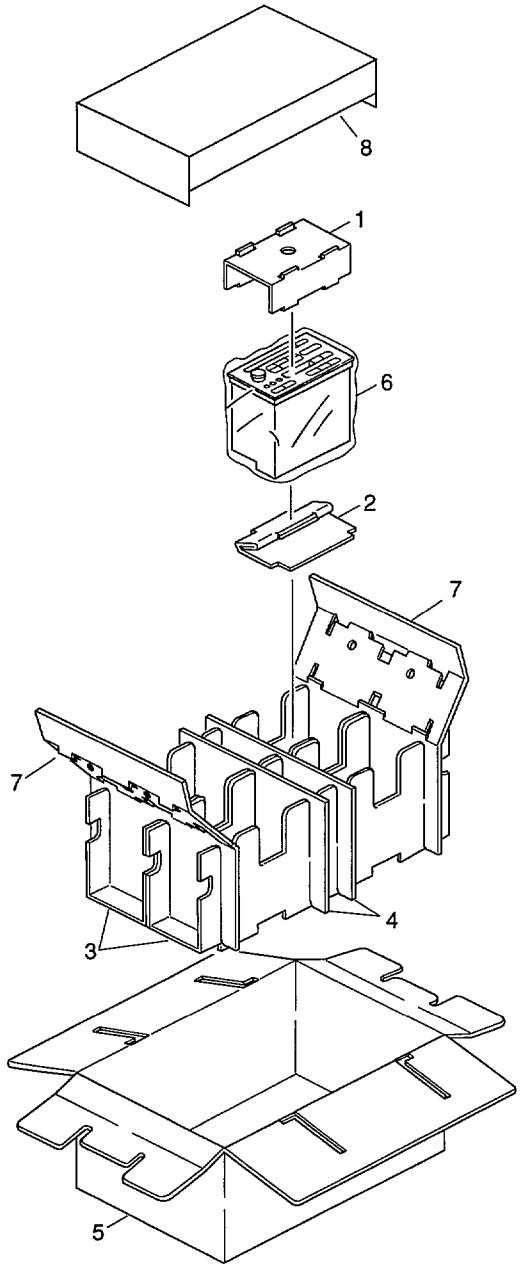


Fig.1

● **Parts List**

Mark No.	Description	Part No.
1	Protector	CHP1912
2	Protector	CHP1823
3	Protector	CHP1825
4	Protector	CHP1826
5	Contain Box	CHL3200
6	Cover	CEG1057
7	Protector	CHP1824
8	Cover	CHW1584

2.2 EXTERIOR

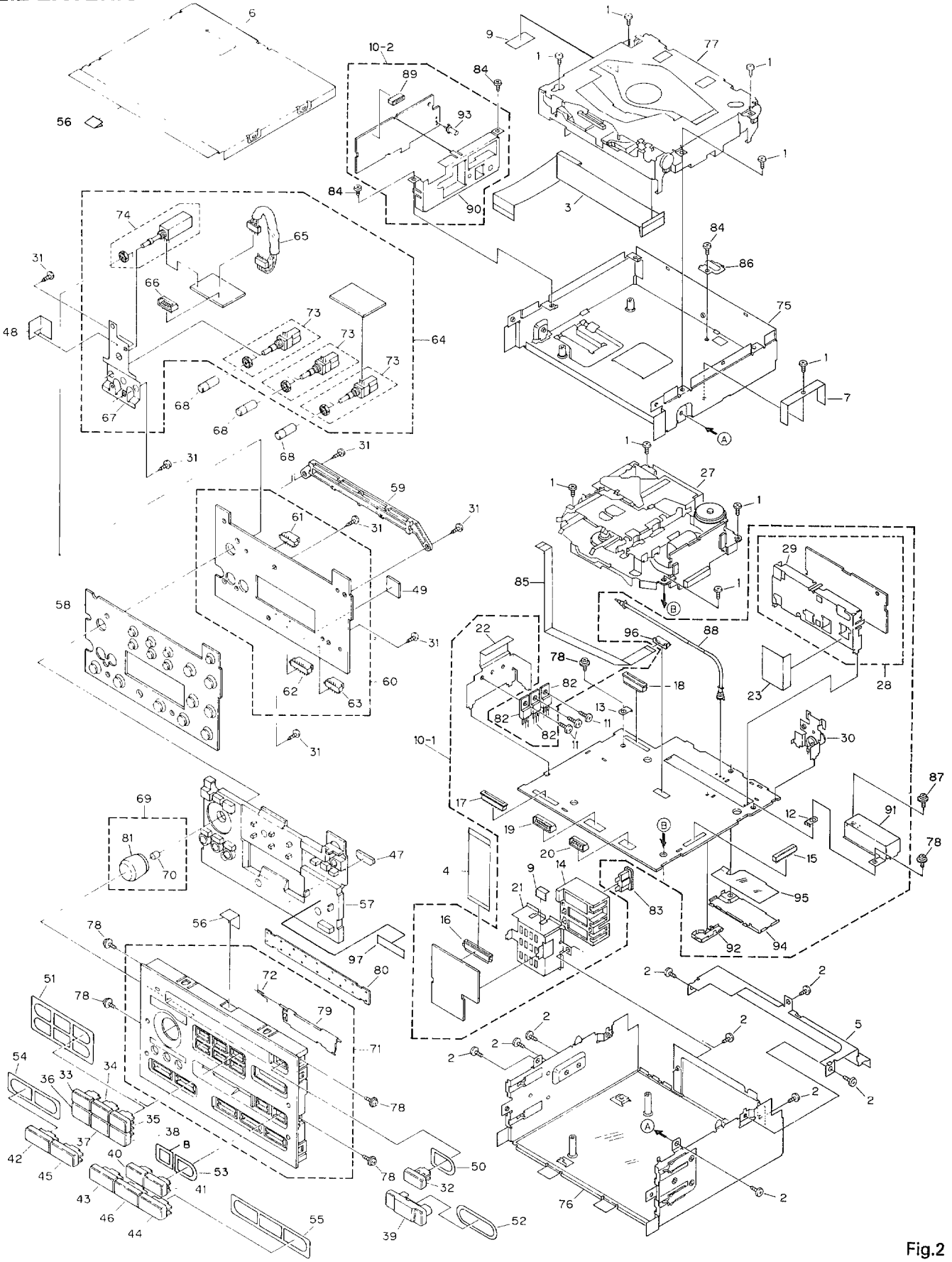


Fig.2

NOTES:

● Parts marked by "＊"are generally unavailable because they are not in our Master Spare Parts List.

● **Parts List**

Mark	No.	Description	Part No.
	1	Screw	BMZ26P050FMC
	2	Screw	BMZ30P050FMC
	3	Connector	CDE4930
	4	Connector	CDE4952
	5	Case	CNB1958
	6	Case	CNB1959
	7	Holder	CNC5985
	8	Insulator	CNM5298
	9	Insulator	CNM5000
	10	Tuner Mother Assy	CWM4380
	11	Screw	BMZ30P060FMC
	12	Terminal(CN803)	CKF1059
	13	Terminal(CN804)	CKF1059
	14	Connector(CN851)	CKM1088
	15	Connector(CN651)	CKS1730
	16	Connector(CN852)	CKS1963
	17	Connector(CN701)	CKS2255
	18	Connector(CN801)	CKS2774
	19	Connector(CN601)	CKS2830
	20	Connector(CN602)	CKS2830
	21	Holder	CNC5906
	22	Holder	CNC5986
＊	23	Insulator	CNM4912
	24-26	•••••	
	27	Cassette Mechanism Module	EXK3210
	28	Tuner Unit	CWE1421
	29	Holder	CNC6122
	30	Antenna Unit(CN501)	CXA9328
	31	Screw	BPZ26P100FMC
	32	Button(⏏)	CAC4365
	33	Button(1)	CAC4366
	34	Button(2)	CAC4367
	35	Button(3)	CAC4368
	36	Button(4)	CAC4369
	37	Button(5)	CAC4370
	38	Button(6)	CAC4371
	39	Button(SEEK)	CAC4372
	40	Button(◁▷)	CAC4373
	41	Button(⏏)	CAC4374
	42	Button(AS)	CAC4375
	43	Button(RADIO)	CAC4377
	44	Button(CD)	CAC4379
	45	Button(TP)	CAC4376
	46	Button(TAPE)	CAC4378
	47	Spacer	CNM4949
	48	Spacer	CNM4982
	49	Spacer	CNM4983
	50	Insulator	CNM5135
	51	Insulator	CNM5136
	52	Insulator	CNM5137
	53	Insulator	CNM5297
	54	Insulator	CNM5139
	55	Insulator	CNM5140
	56	Insulator	CNM5247
	57	Lighting Conductor	CNV4220
	58	Rubber	CNV4222
	59	Holder	CNV4535
	60	Key Board Unit	CWM4355
	61	Connector(CN903)	CKS3340
	62	Connector(CN901)	CKS3341
	63	Connector(CN902)	CKS3341
	64	Volume Unit	CWM4511
	65	Cord(CN904)	CDE4761
	66	Connector(CN905)	CKS2829
	67	Holder	CNC6818
	68	Knob Assy	CXA7840
	69	Knob Assy	CXA7839
	70	Spring	CBL-108
	71	Grille Unit	CXA7838
	72	Spring	CBH1371
	73	Volume(VR902,903,904)	CCS1089
	74	Volume(VR901)	CSD1031
	75	Chassis Unit	CXA7830
	76	Chassis Unit	CXA7831
	77	CD Mechanism Module(S7)	CXK5022
	78	Screw	IMS30P050FMC
＊	79	Door	CAT1684
＊	80	Cover	CNM4768
＊	81	Knob	CAA1383
	82	Transistor(Q802,815,818)	2SB1185
	83	Fuse(FU851)	CEK1005
	84	Screw	BMZ26P050FMC
	85	Connector	CDE4931
	86	Holder	CNC4963
	87	Screw	IMS30P050FMC
	88	Antenna Cable(CN551)	CDH1219
	89	Connector(CN2)	CKS2239
	90	Holder	CNC6121
	91	Shield	CNC6399
	92	Shield	CNC6532
	93	Mini Pin Jack(CN1)	CKX1046
	94	Shield	CNC6533
	95	Insulator	CNM4808
	96	Connector(CN552)	CKS1947
	97	Film	CNM5299

2.3 CD MECHANISM MODULE

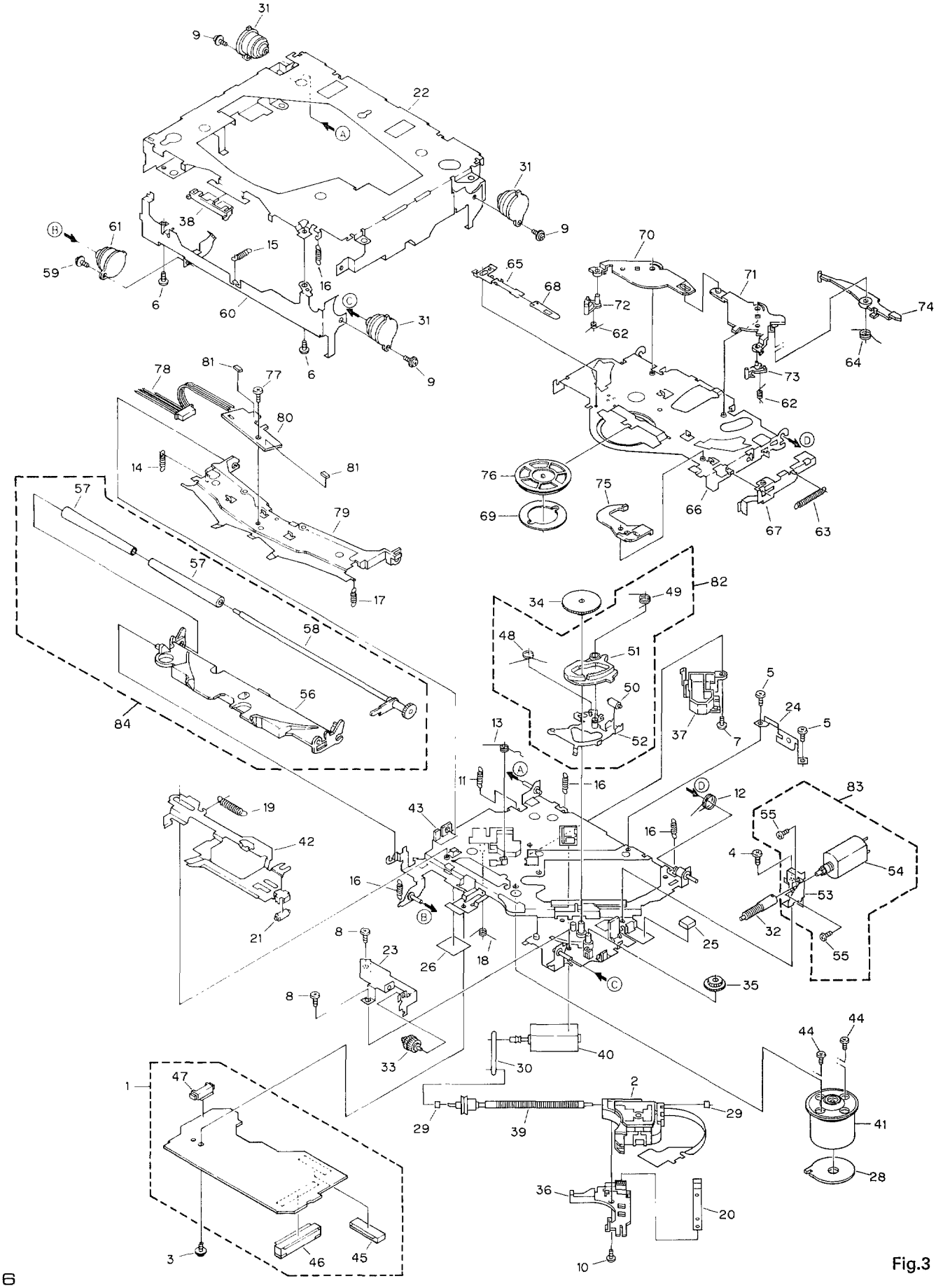


Fig.3

● Parts List

Mark	No.	Description	Part No.
	1	Control Unit	CWX2096
	2	Pickup Unit(Service)	CXX1230
	3	Screw	IMS26P035FMC
	4	Screw	BMZ20P025FMC
	5	Screw	BMZ20P040FMC
	6	Screw	BSZ20P040FMC
	7	Screw(M2×3)	CBA1077
	8	Screw(M2×2)	CBA1250
	9	Screw(M2×5)	CBA1296
	10	Screw(M2×3.85)	CBA1362
	11	Spring	CBH1724
	12	Spring	CBH1729
	13	Spring	CBH1730
	14	Spring	CBH1731
	15	Spring	CBH1732
	16	Spring	CBH1745
	17	Spring	CBH1848
	18	Spring	CBH1849
	19	Spring	CBH1939
	20	Spring	CBL1214
	21	Roller	CLA2627
	22	Frame	CNC5796
	23	Bracket	CNC5871
*	24	Bracket	CNC6376
	25	Cushion	CNM3917
	26	Sheet	CNM4873
	27	•••••	
	28	PCB	CNP4230
	29	Bearing	CNR1415
	30	Belt	CNT1071
	31	Damper	CNV3974
	32	Gear	CNV4128
	33	Gear	CNV4129
	34	Gear	CNV4857
	35	Gear	CNV4131
	36	Holder	CNV4663
	37	Holder	CNV4664
	38	Guide	CNV4484
	39	Screw Unit	CXA8699
	40	CRG Motor Unit(M2)	CXA8986
	41	Motor Unit(M1)	CXA8912
	42	Lever Unit	CXA9300
	43	Chassis Unit	CXA9515
	44	Screw	JFZ20P025FMC
	45	Connector(CN101)	CKS1953
	46	Connector(CN701)	CKS2774
	47	Connector(CN801)	CKS2196
	48	Spring	CBH1832
	49	Spring	CBH1833
	50	Roller	CLA2627
	51	Arm	CNV4136
	52	Arm Unit	CXA8565
	53	Bracket	CNC6056
	54	Load Motor Unit(M3)	CXA8702
	55	Screw	JFZ20P025FMC
	56	Arm	CNV4120
	57	Roller	CNV4509
	58	Gear Unit	CXA8701
	59	Screw(M2×5)	CBA1296
	60	Frame	CNC5797
	61	Damper	CNV3974
	62	Spring	CBH1736
	63	Spring	CBH1863
	64	Spring	CBH1945
	65	Spring	CBL1269
	66	Arm	CNC5799
	67	Lever	CNC6054
	68	Spacer	CNM3315
	69	Sheet	CNM4849
	70	Arm	CNV4122
	71	Arm	CNV4123
	72	Arm	CNV4124
	73	Arm	CNV4125
	74	Arm	CNV4138
	75	Arm	CNV4139
	76	Clamper	CNV4140
	77	Screw(M2×2)	CBA1250
	78	Connector(CN1)	CDE4576
	79	Arm	CNC5801
*	80	Gathering PCB	CNX2445
	81	Photo-transistor(Q1, 2)	CPT-230S-X
	82	Elbow Arm Assy	CXA8889
	83	Load Motor Assy	CXA8891
	84	LO Arm Assy	CXA8892

2.4 CASSETTE MECHANISM MODULE

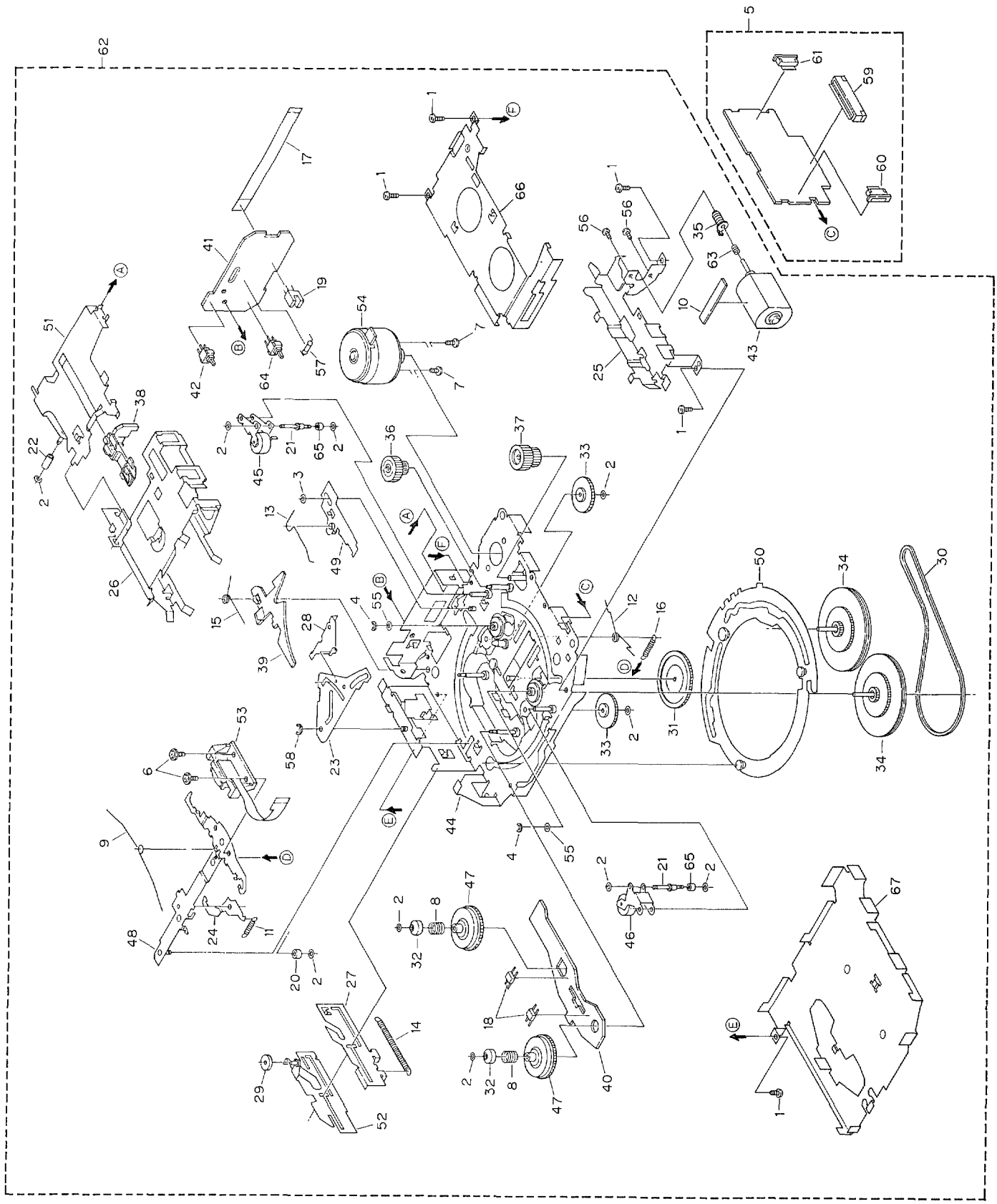


Fig.4

● Parts List

Mark No.	Description	Part No.
1	Screw	BSZ20P040FMC
2	Washer	CBF1037
3	Washer	CBF1038
4	Washer	CBG1003
5	Deck Unit	CWM4527
6	Screw	EBA1028
7	Screw	EBA1037
8	Spring	EBH1531
9	Spring	EBH1589
10	Cushion	ENM1034
11	Spring	EBH1515
12	Spring	EBH1587
13	Spring	EBH1517
14	Spring	EBH1518
15	Spring	EBH1519
16	Spring	EBH1537
17	Cord	EDD1015
18	Photo-reflector(EGN2,3)	EGN1004
19	Photo-interrupter(EGN1)	EGN1005
20	Roller	ENR1031
21	Shaft	ELA1362
22	Roller	ELA1348
23	Arm	ENC1396
24	Arm	ENC1397
25	Guide	ENC1398
26	Holder	ENC1417
27	Lever	ENC1448
28	Arm	ENC1401
29	Roller	ENR1027
30	Belt	ENT1027
31	Gear	ENV1347
32	Collar	ENV1508
33	Gear	ENV1350
34	Flywheel	ENV1410
35	Worm Gear	ENV1439
36	Worm Wheel	ENV1440
37	Gear	ENR1028
38	Lever	ENV1442
39	Arm	ENV1445
40	Gathering P.C.Board	ENX1029
41	Gathering P.C.Board	ENX1030
42	Switch(S1)	ESG1004
43	Motor Unit(M2)	EXA1382
44	Chassis Unit	EXA1495
45	Pinch Roller Unit	EXA1472
46	Pinch Roller Unit	EXA1473
47	Reel Unit	EXA1423
48	Head Base Unit	EXA1434
49	Lever Unit	EXA1438
50	Gear Unit	EXA1389
51	Frame Unit	EXA1476
52	Lever Unit	EXA1439
53	Head Assy(HD1)	EXA1488
54	Motor Unit(M1)	EXA1381
55	Washer	HBF-179
56	Screw	JGZ20P025FNI
57	Resistor(R1)	RD1/4HM181J
58	Washer	YE20FUC
59	Connector(CN251)	CKS1711
60	Connector(CN252)	CKS2127
61	Connector(CN253)	CKS2129
62	Spare Unit	EXA3008
63	Spring	EBH1545
64	Switch(S2)	ESG1004
65	Roller	ENR1023
66	Cover	ENC1412
67	Cover	ENC1413

3. SCHEMATIC DIAGRAM

● Level Diagram

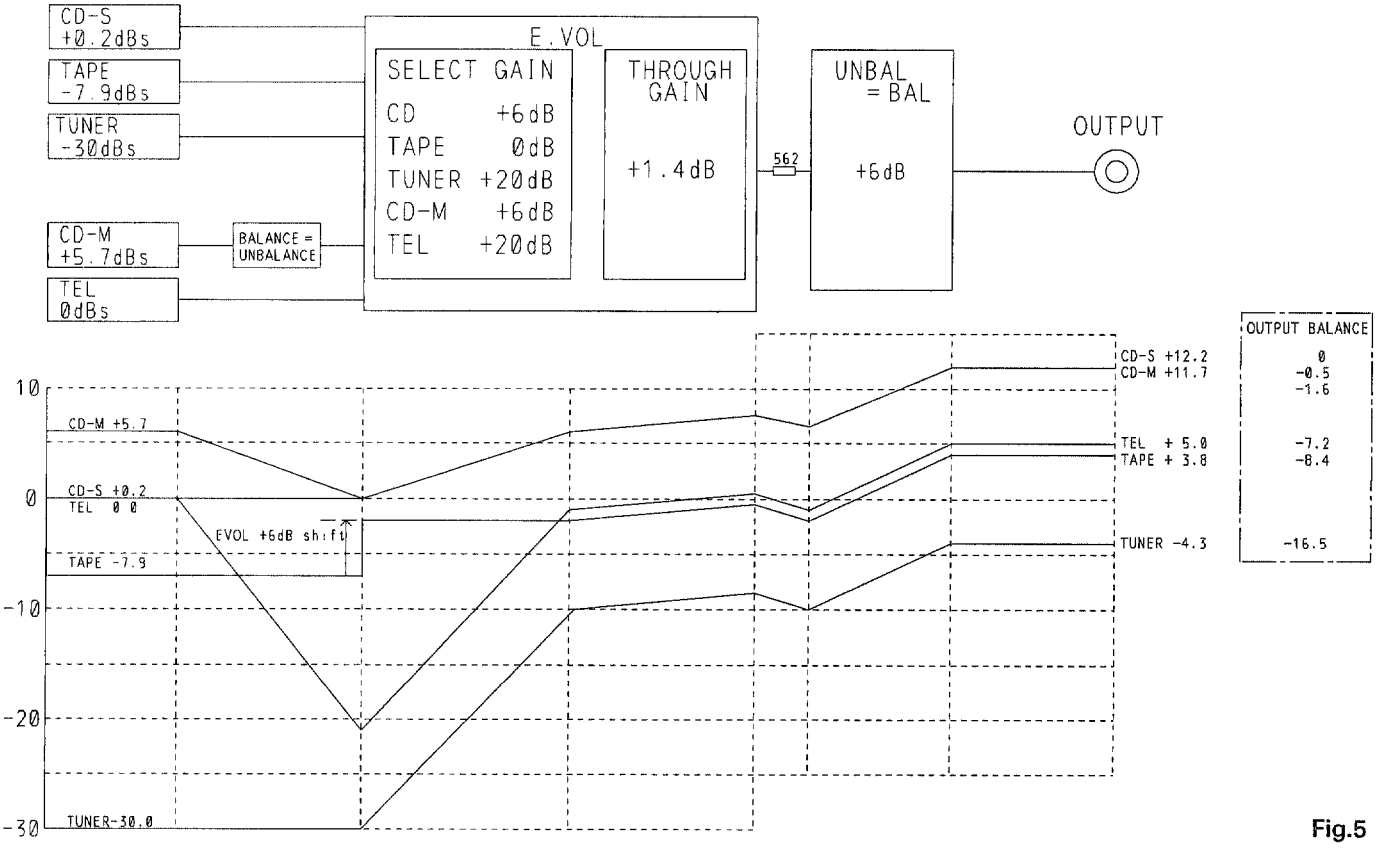
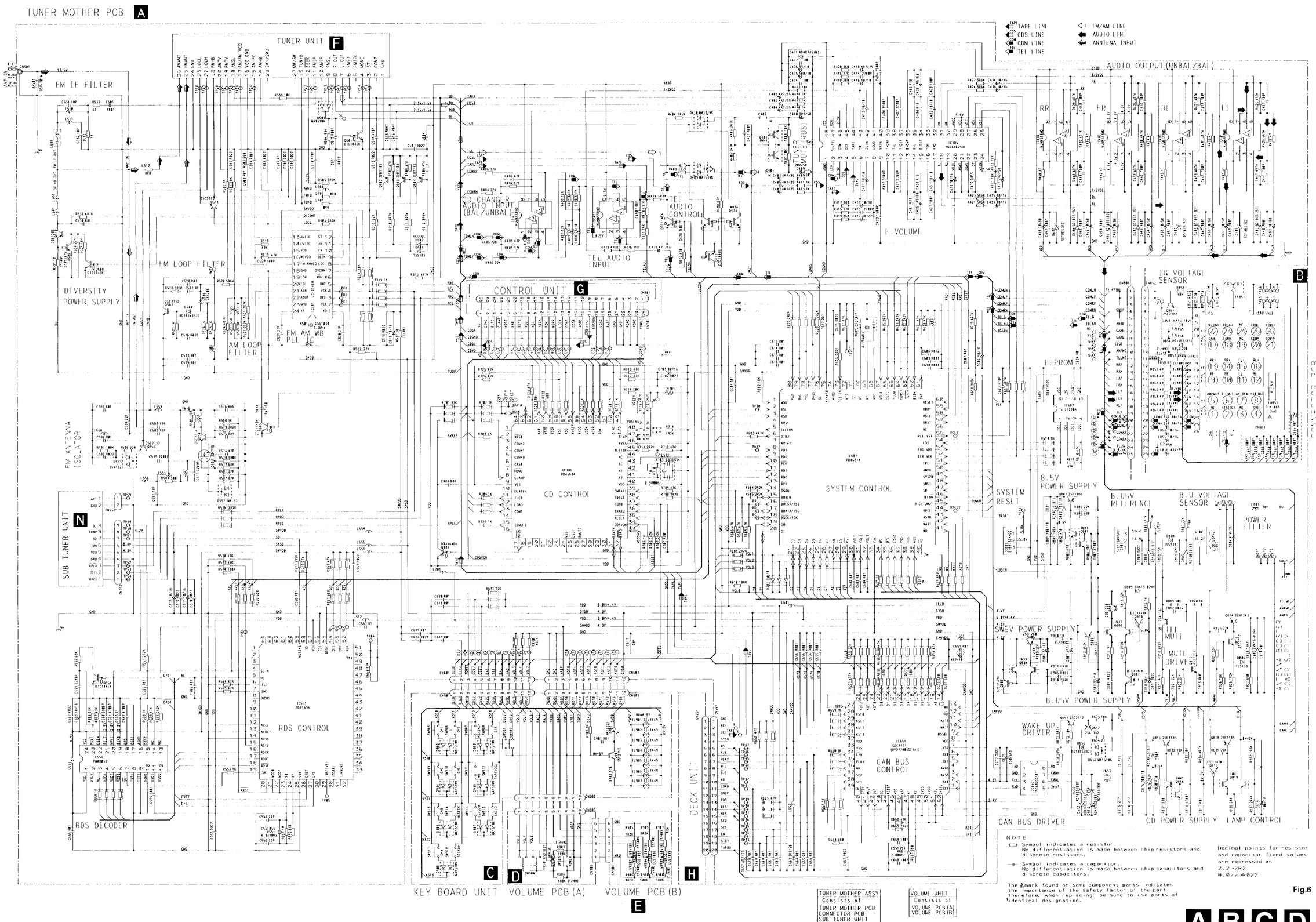


Fig.5

3.1 OVERALL CONNECTION DIAGRAM



NOTE

- Symbol indicates a resistor. No differentiation is made between chip resistors and discrete resistors.
- Symbol indicates a capacitor. No differentiation is made between chip capacitors and discrete capacitors.

The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

Decimal points for resistor and capacitor fixed values are expressed as 2.2→2R2, 0.022→R022

Fig.6

3.2 CD MECHANISM MODULE

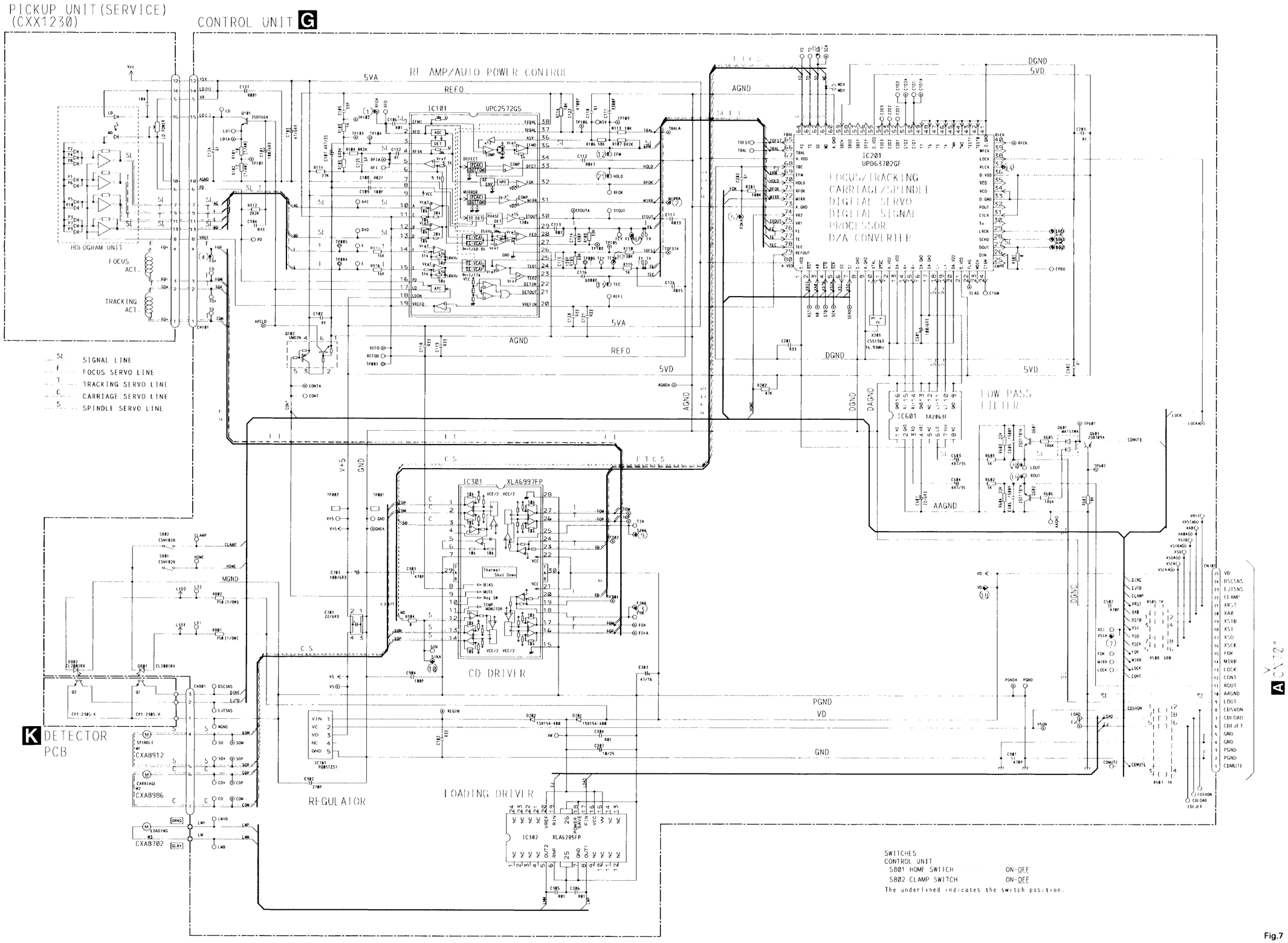


Fig.7

3.3 TUNER UNIT

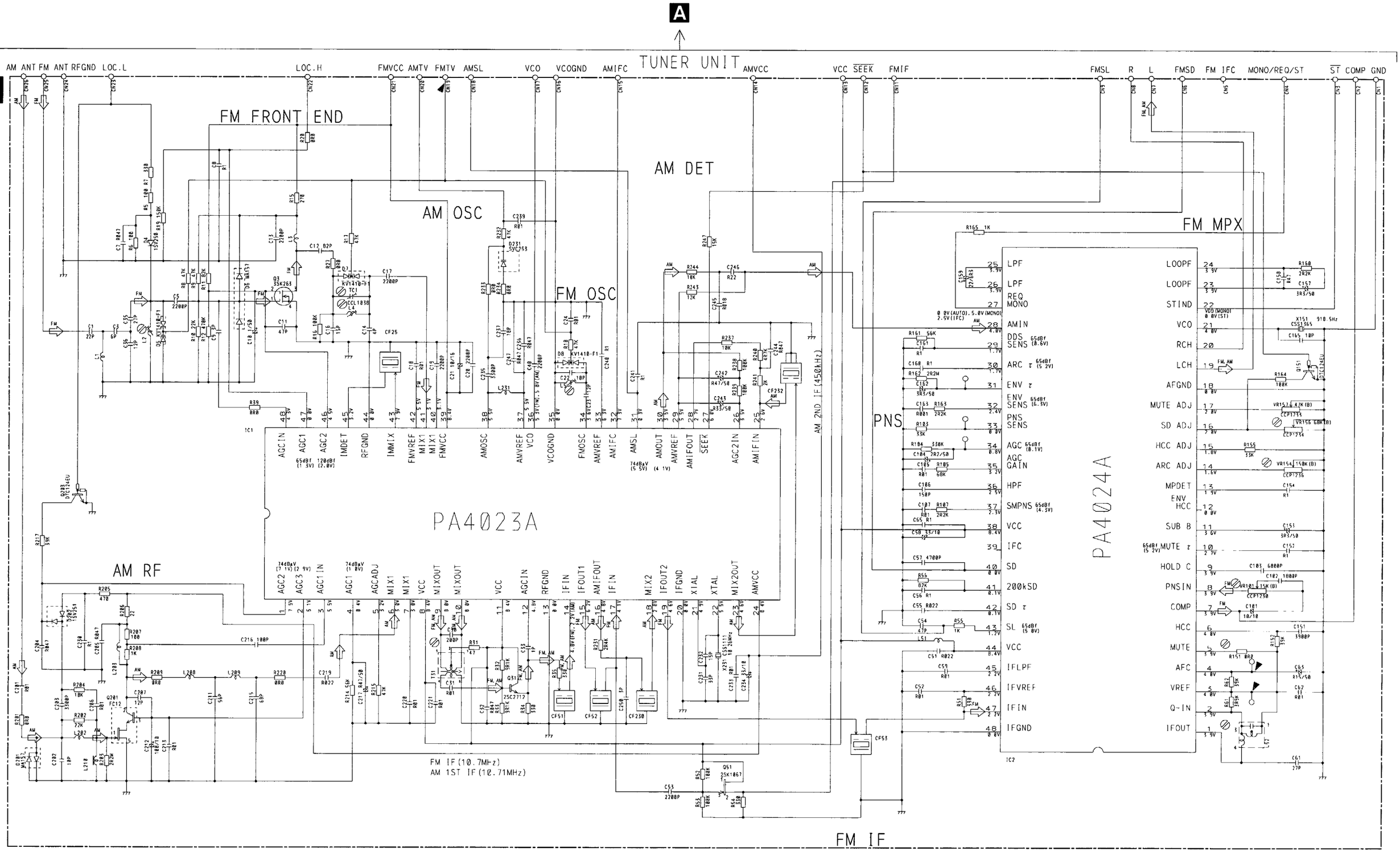
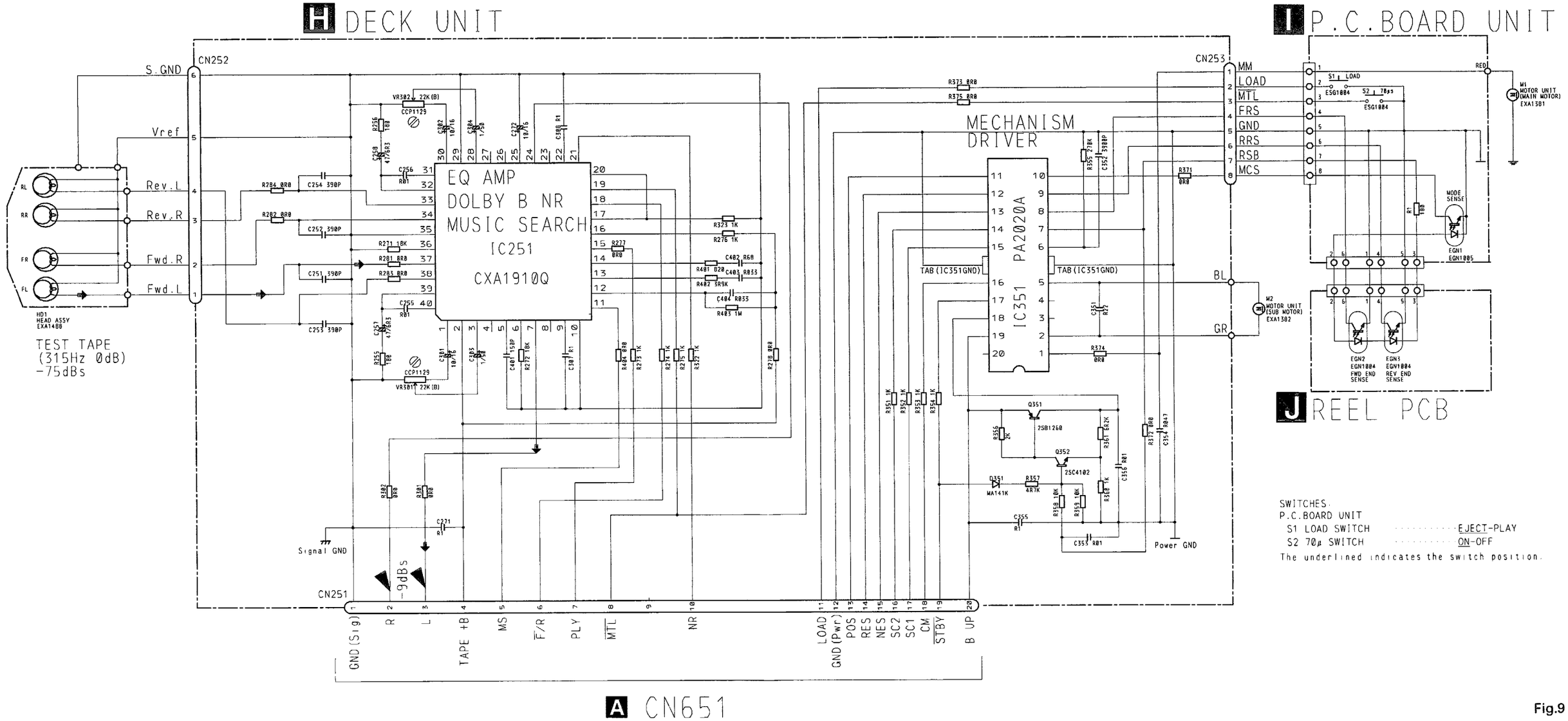


Fig.8

3.4 CASSETTE MECHANISM MODULE



SWITCHES:
P.C.BOARD UNIT
S1 LOAD SWITCH ..... EJECT-PLAY
S2 70μ SWITCH ..... ON-OFF
The underlined indicates the switch position.

Fig.9

3.5 SUB TUNER UNIT

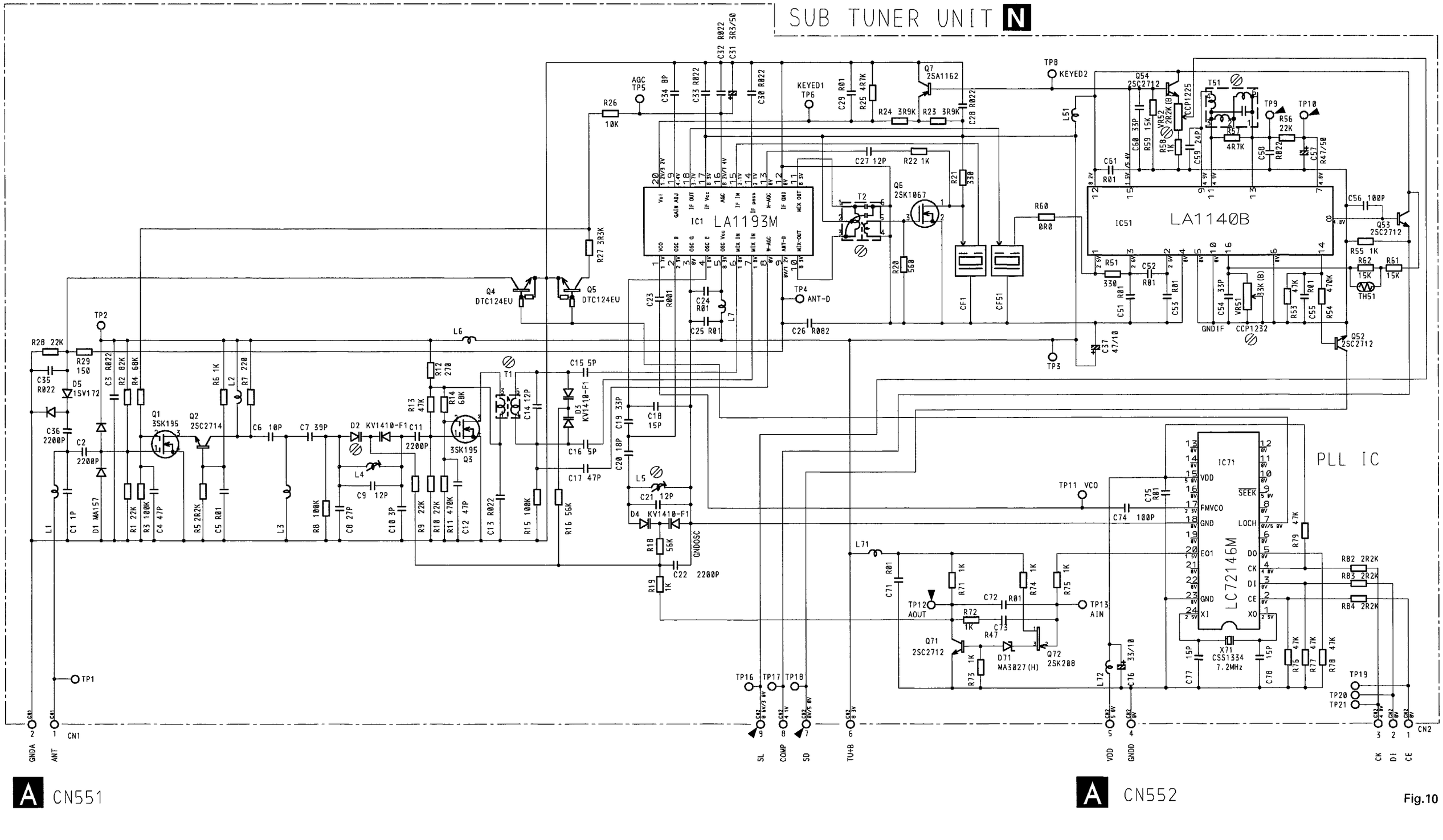
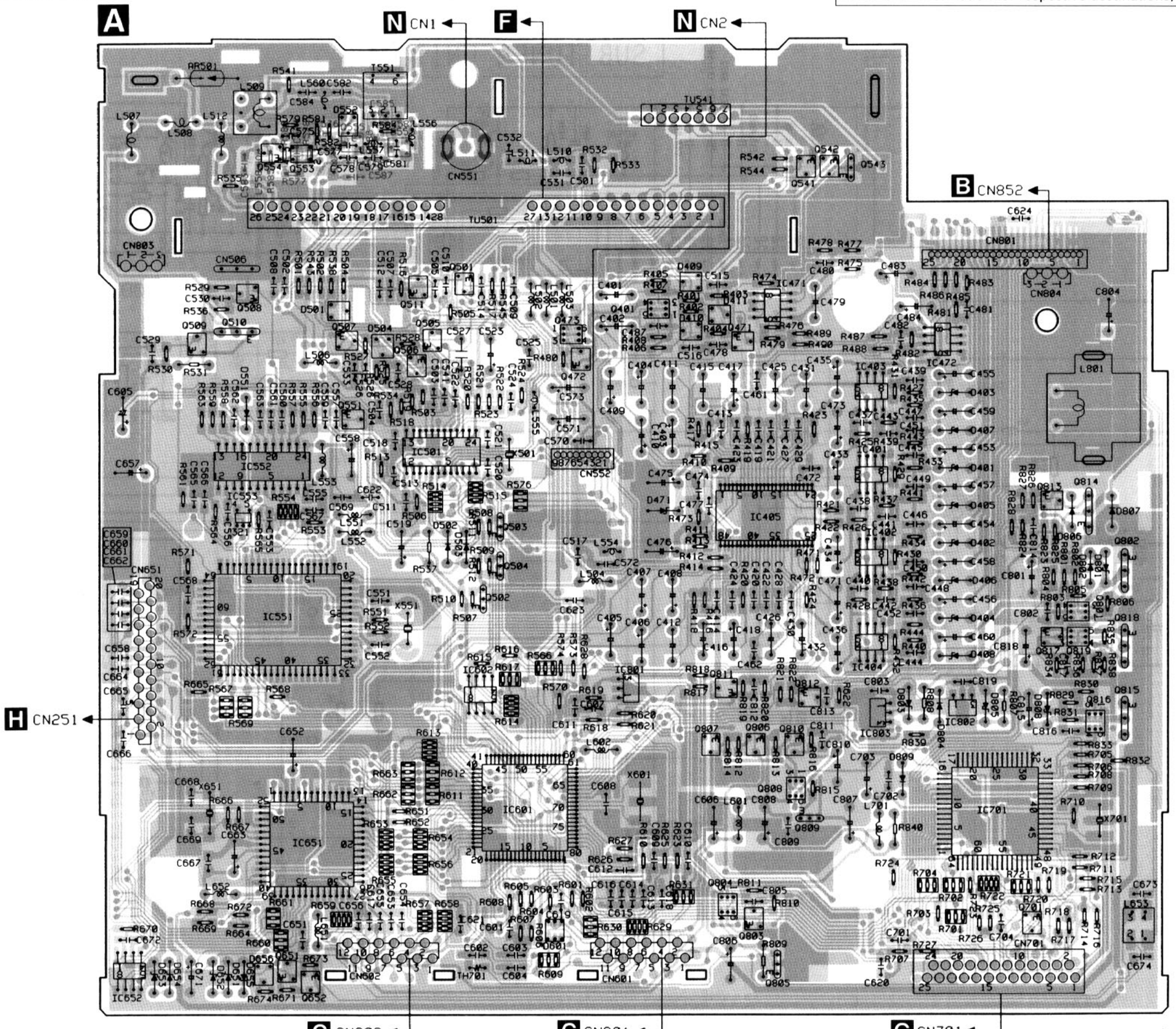


Fig.10

4. PCB CONNECTION DIAGRAM

4.1 TUNER MOTHER PCB

NOTE:
The parts mounted on this PCB include all necessary parts for several destinations.
For further information for respective destinations, be sure to check with the schematic diagram.



IC.0

Q553
Q555
Q554
Q541 Q542
Q543

Q511

Q501 IC471
Q508
Q510 Q507 Q505 Q473 Q401 IC472
Q509 Q471
Q472

Q506

Q551
IC403

IC501

IC552
Q813
IC401
IC405
IC553 Q814
Q503

Q802
Q504
IC402

IC551 Q502
Q817 Q801 Q819
Q818

IC602
IC404
Q812
IC801 Q811 IC803 Q815
IC802
Q816

Q807 Q806 Q810

Q808
IC601
Q809 IC701
IC651

Q803
Q804
Q701
IC652
Q651

Q805
Q652

Fig.11

4.2 CD MECHANISM MODULE

● (1/2)

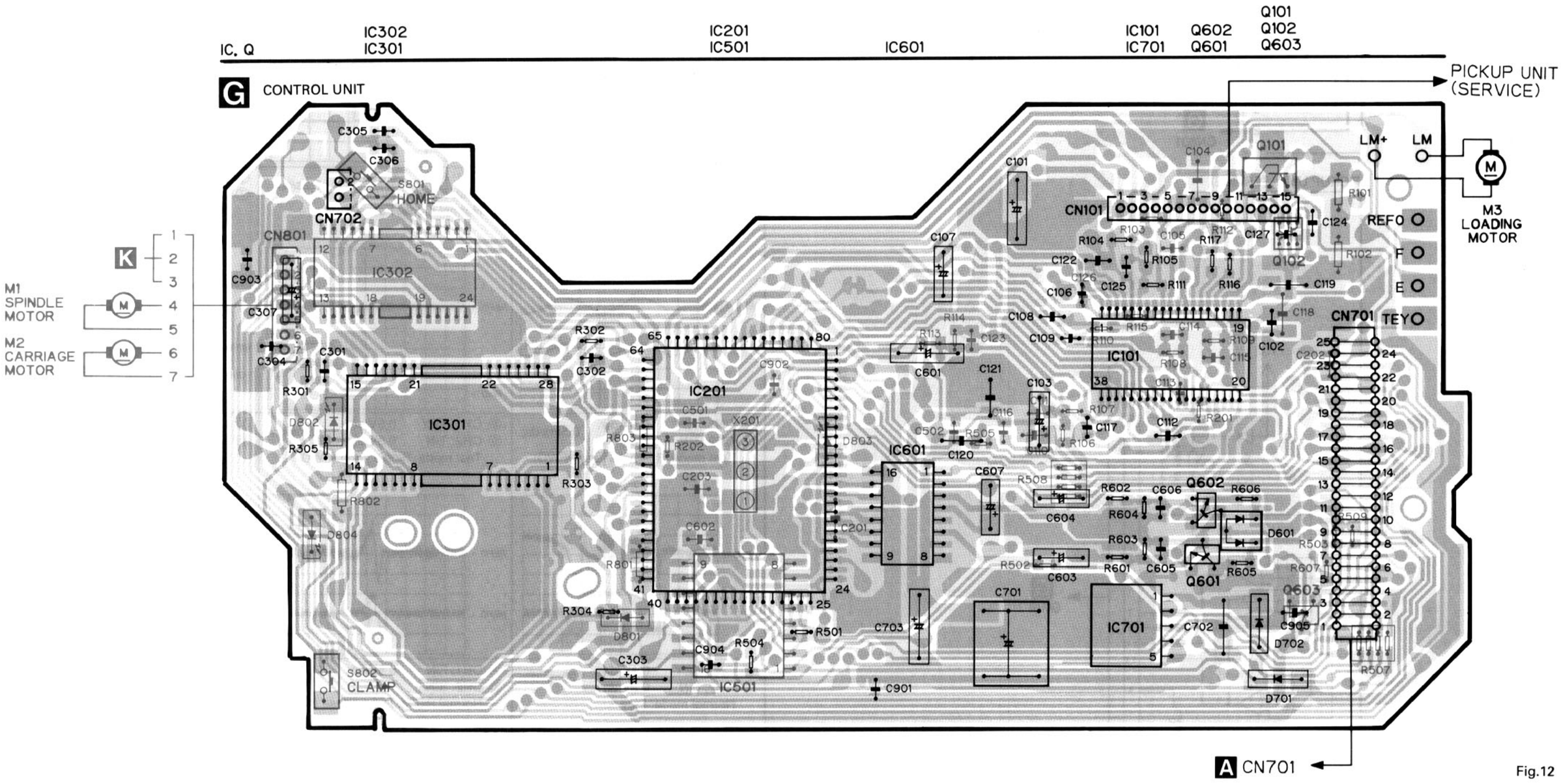
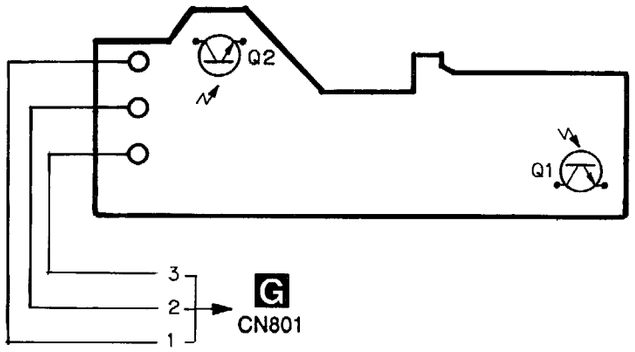


Fig.12

NOTE:

The parts mounted on this PCB include all necessary parts for several destinations.
For further information for respective destinations, be sure to check with the schematic diagram.

K DETECTOR PCB



PICKUP UNIT(SERVICE)

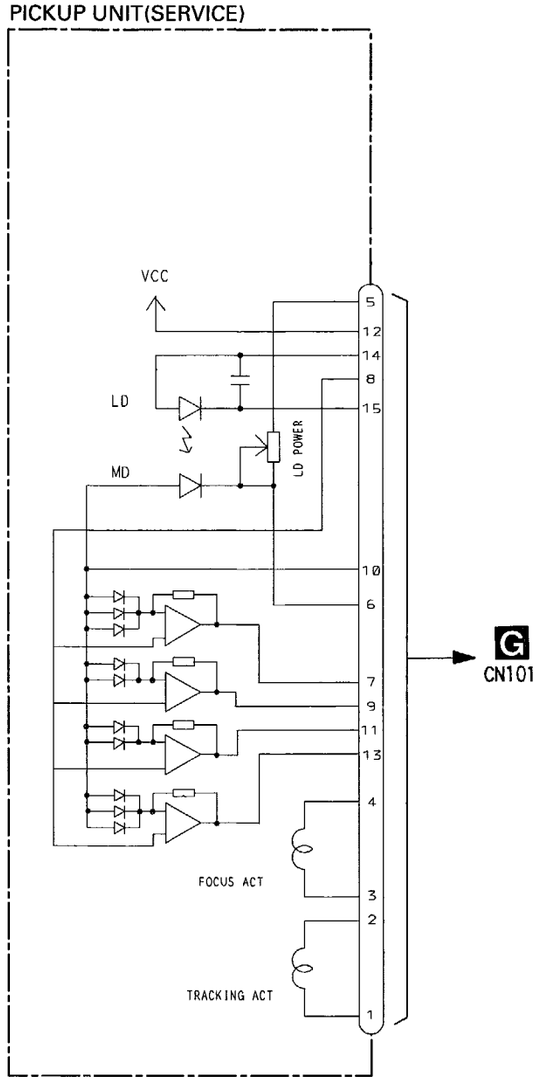


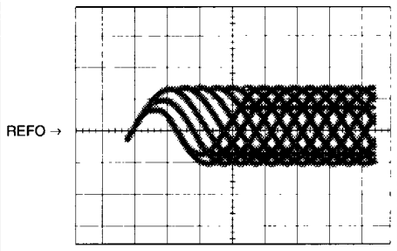
Fig.13

NOTE:
The parts mounted on this PCB include all necessary parts for several destinations.
For further information for respective destinations, be sure to check with the schematic diagram.

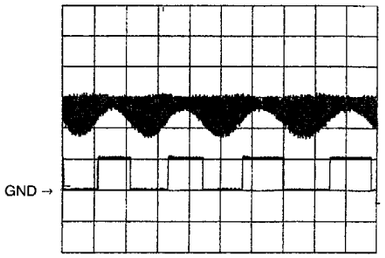
2. Reference voltage
REFO:2.5V

● Waveforms

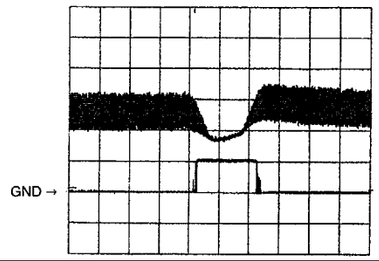
① RFO 0.5V/div. 0.5µs/div.
Normal mode: play



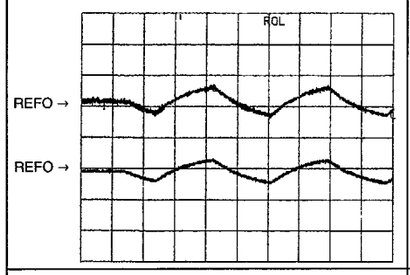
① CH1: RFO 1V/div.
② CH2: MIRR 5V/div. 0.5ms/div.
Test mode: Tracking open



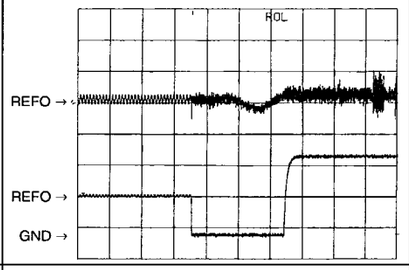
① CH1: RFO 1V/div.
② CH2: MIRR 5V/div. 0.5ms/div.
Nomal mode: The defect part passes 800µm



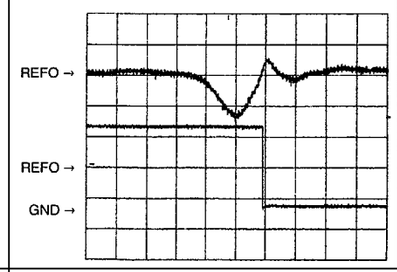
③ CH1: FIN 0.5V/div.
④ CH2: FO+ 2V/div. 0.2s/div.
Test mode: No disc, Focus close



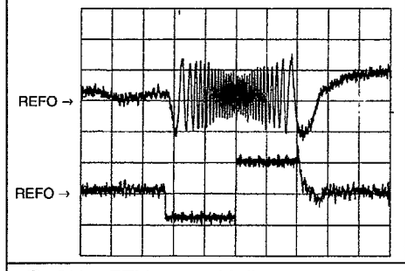
③ CH1: FIN 0.5V/div.
⑤ CH2: FOK 2V/div. 0.2s/div.
Normal mode: Focus close



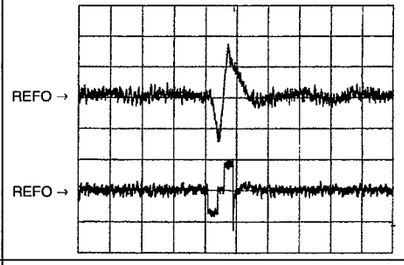
⑥ CH1: FEY 0.5V/div.
⑦ CH2: XSI 2V/div. 1ms/div.
Normal mode: Focus close



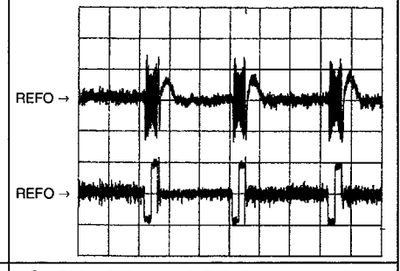
⑧ CH1: TEY 0.5V/div.
⑨ CH2: TIN 0.5V/div. 0.5ms/div.
Test mode: 32 tracks jump (FWD)



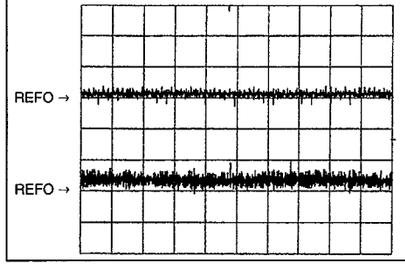
⑧ CH1: TEY 0.5V/div.
⑨ CH2: TIN 0.5V/div. 0.5ms/div.
Test mode: Single jump (FWD)



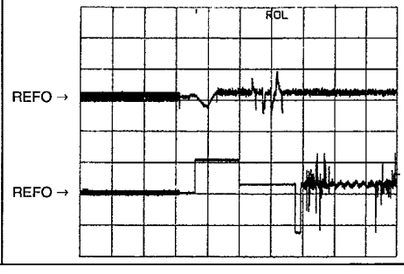
⑧ CH1: TEY 0.5V/div.
⑨ CH2: TIN 0.5V/div. 5ms/div.
Test mode: 100 tracks jump (FWD)



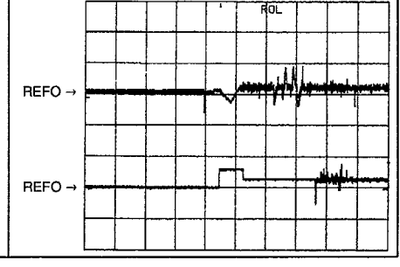
⑥ CH1: FEY 0.1V/div.
③ CH2: FIN 0.2V/div. 20ms/div.
Normal mode: Play



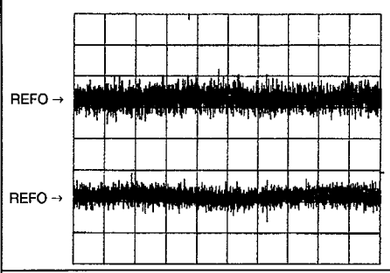
③ CH1: FIN 0.5V/div.
⑩ CH2: SIN 1V/div. 0.5s/div.
Normal mode: Focus close (12cm)



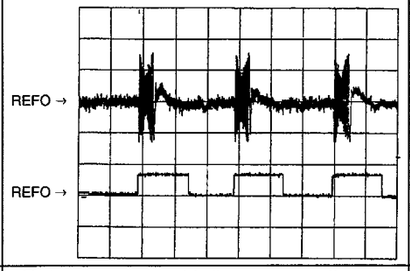
③ CH1: FIN 0.5V/div.
⑩ CH2: SIN 1V/div. 0.5s/div.
Normal mode: Focus close (8cm)



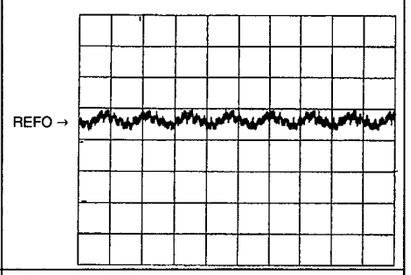
⑧ CH1: TEY 0.2V/div.
⑨ CH2: TIN 0.2V/div. 20ms/div.
Normal mode: play



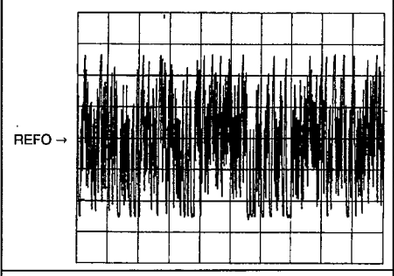
⑧ CH1: TEY 0.5V/div.
⑪ CH2: SD 0.5V/div. 5ms/div.



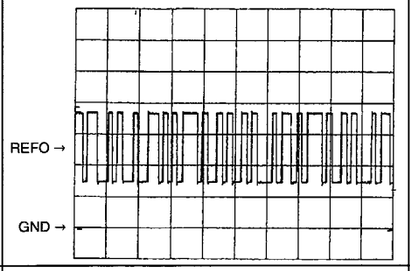
⑩ SIN 0.5V/div. 0.1s/div.
Normal mode: Play (12cm)



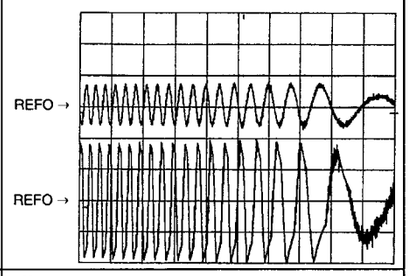
⑩ SIN 0.5V/div. 10ms/div.
Long Search (12cm)



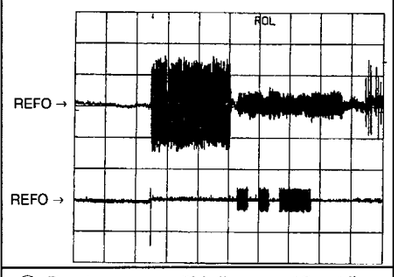
⑫ EFM 1V/div. 5µs/div.
Play



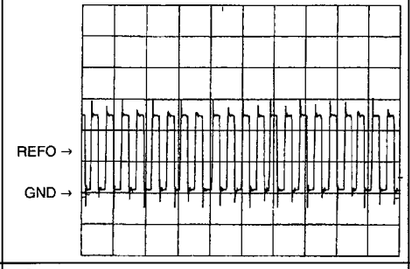
⑧ CH1: TEY 1V/div.
⑬ CH2: TEC 1V/div. 2ms/div.
Test mode: Focus close
Tracking open



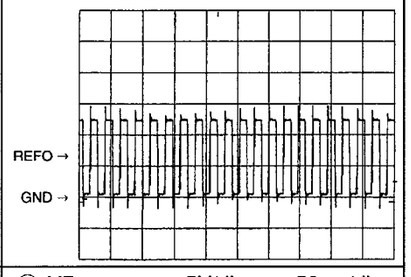
⑧ CH1: TEY 0.5V/div.
⑥ CH2: FEY 0.5V/div. 0.2s/div.
Normal mode: AGC after focus close



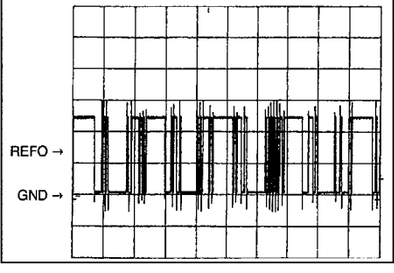
⑭ PLCK 2V/div. 0.5µs/div.
Play



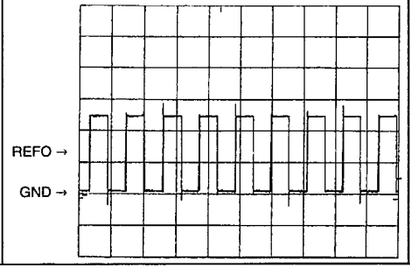
⑮ SCKO 2V/div. 1µs/div.
Play



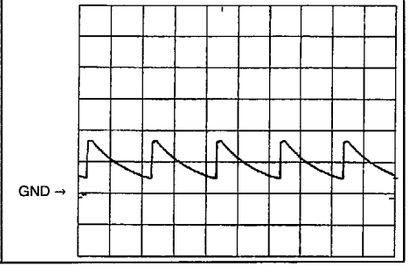
⑯ Dout 2V/div. 10µs/div.
Play



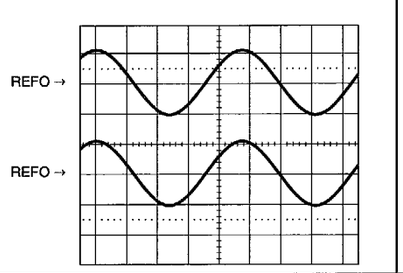
⑰ LRCK 2V/div. 20µs/div.



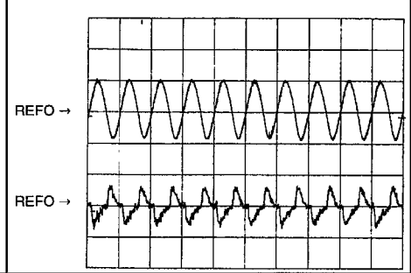
⑱ VD 5V/div. 50ms/div.
Normal mode: No disc



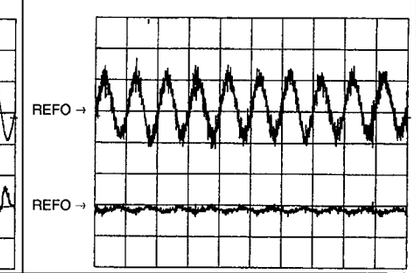
⑲ CH1: R OUT 1V/div.
⑳ CH2: L OUT 1V/div. 0.2ms/div.
Normal mode: Play (1kHz 0dB)



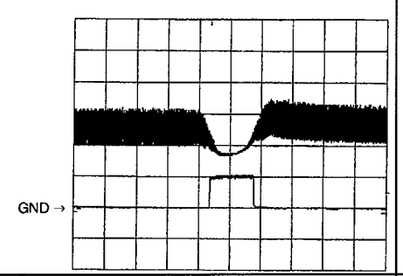
⑥ CH1: FEY 0.2V/div.
③ CH2: FIN 0.5V/div. 1ms/div.
Normal mode: During AGC



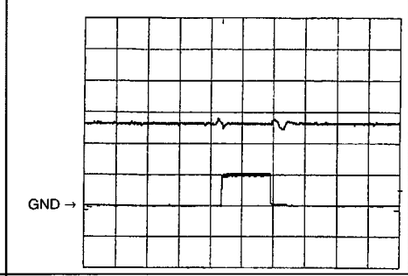
⑧ CH1: TEY 0.2V/div.
⑨ CH2: TIN 0.5V/div. 1ms/div.
Normal mode: During AGC



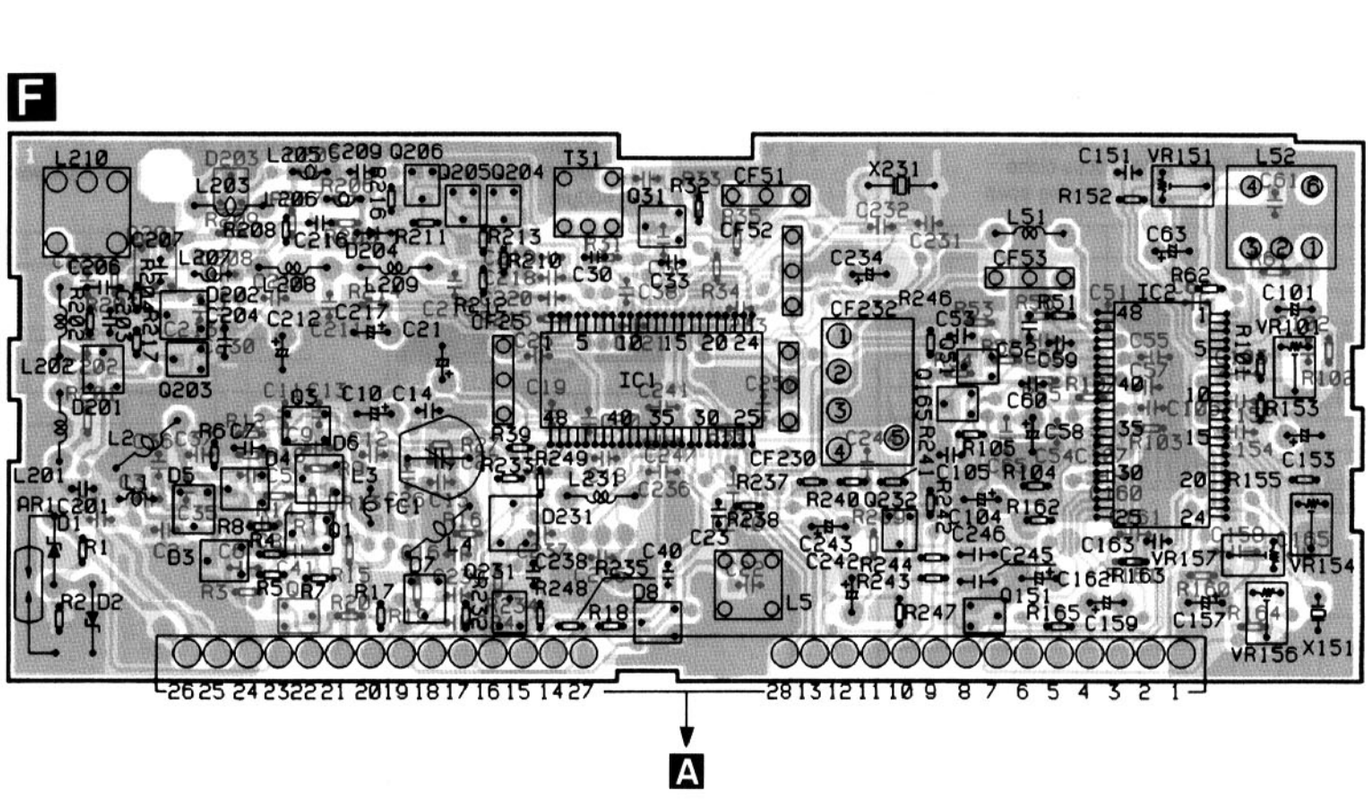
① CH1: RFO 1V/div.
㉑ CH2: HOLD 5V/div. 0.5ms/div.
Normal mode: The defect part passes 800µm



③ CH1: FIN 1V/div.
㉑ CH2: HOLD 5V/div. 0.5ms/div.
Normal mode: The defect part passes 800µm



4.3 TUNER UNIT



ADJ	IC. Q
VR151	Q206 Q205 Q201 Q204 Q31
VR101	IC1 Q203 Q51 IC2 Q165
	Q3
VR154 VR157	Q232 Q1 Q151
VR156	Q2 Q231

Fig.14

NOTE:

The parts mounted on this PCB include all necessary parts for several destinations.
For further information for respective destinations, be sure to check with the schematic diagram.

4.4 KEY BOARD UNIT

NOTE:
The parts mounted on this PCB include all necessary parts for several destinations.
For further information for respective destinations, be sure to check with the schematic diagram.

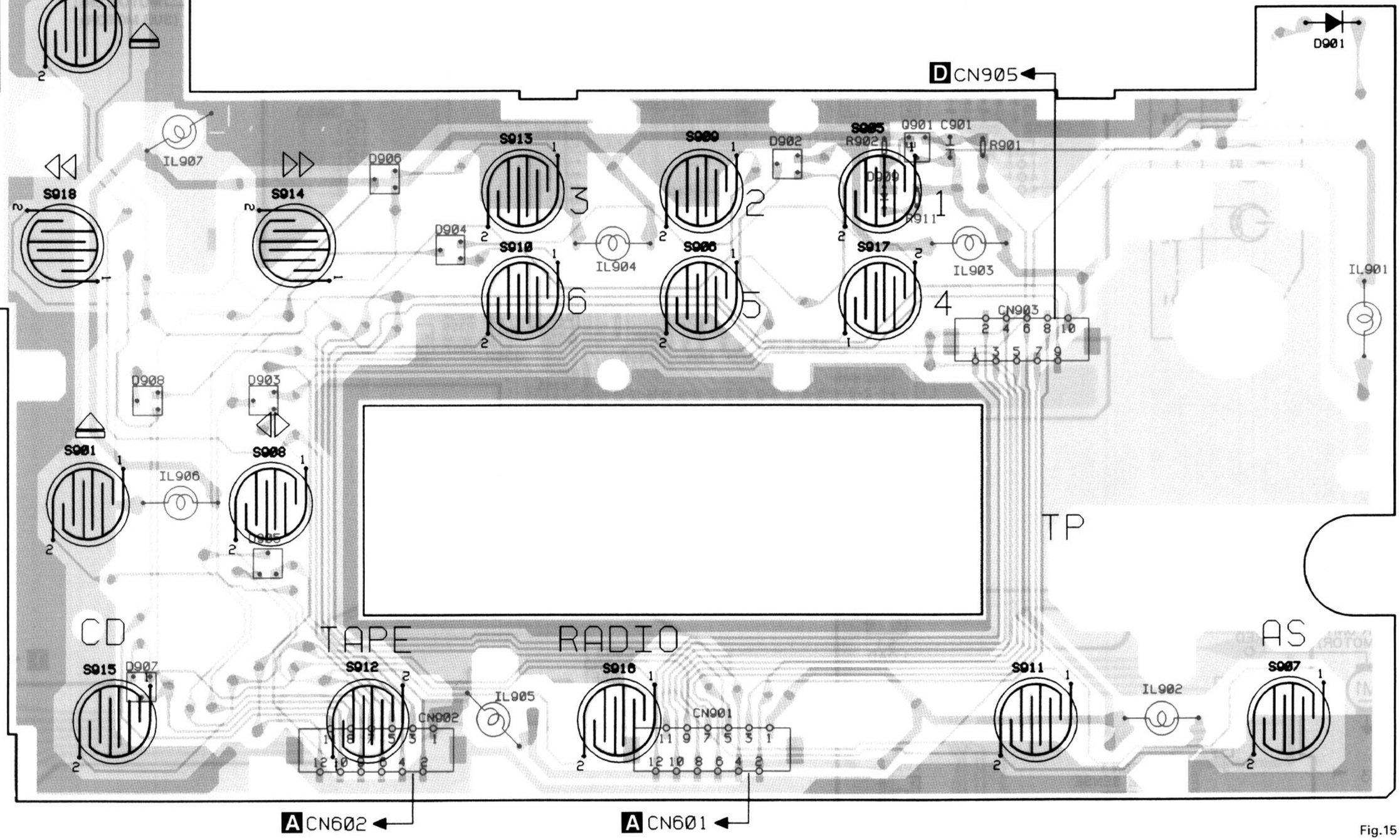
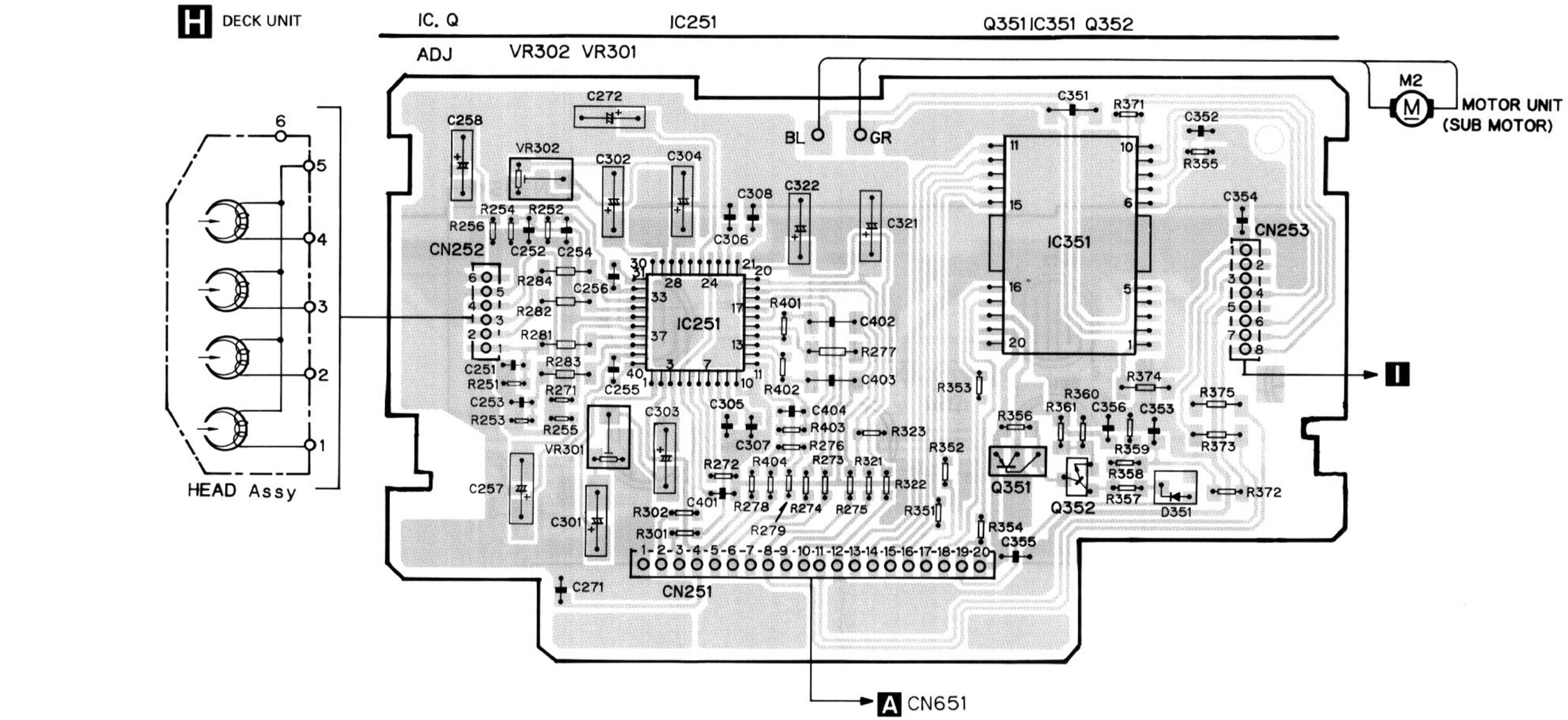
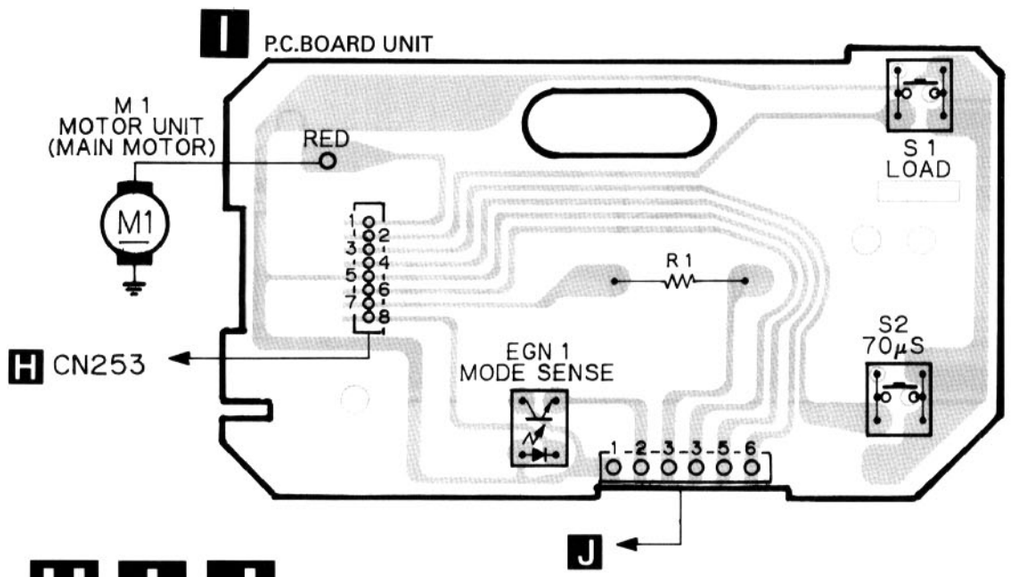
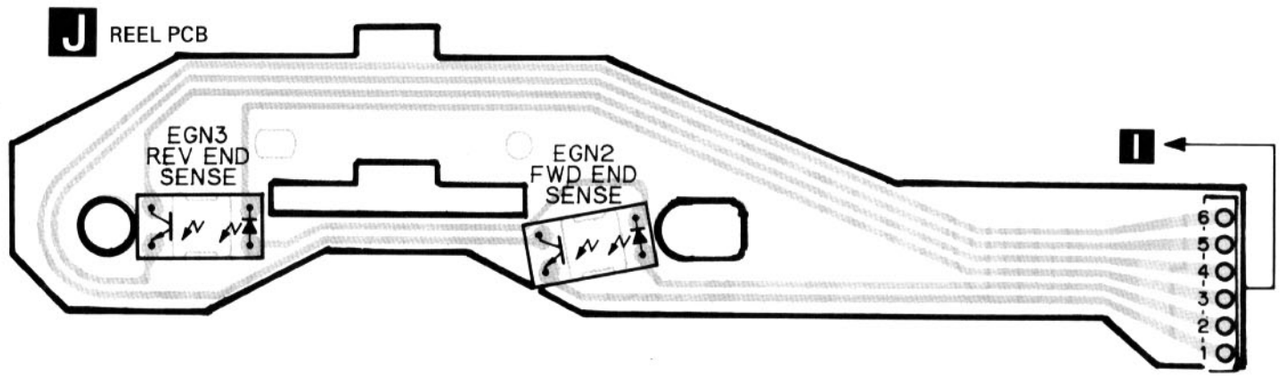


Fig.15

4.5 CASSETTE MECHANISM MODULE



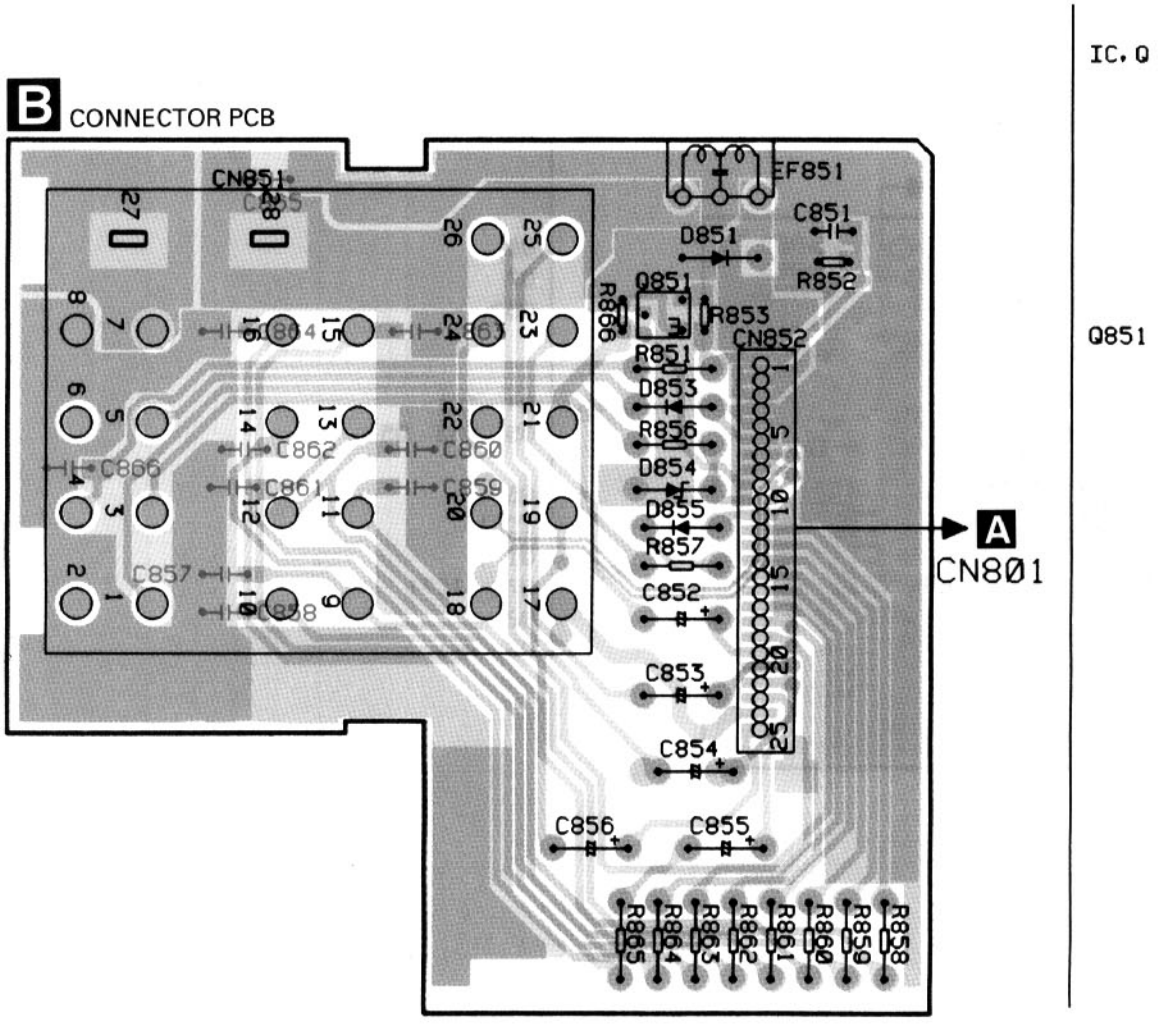




NOTE:
The parts mounted on this PCB include all necessary parts for several destinations.
For further information for respective destinations, be sure to check with the schematic diagram.

Fig.16

4.6 CONNECTOR PCB , VOLUME UNIT



NOTE:

The parts mounted on this PCB include all necessary parts for several destinations.
For further information for respective destinations, be sure to check with the schematic diagram.

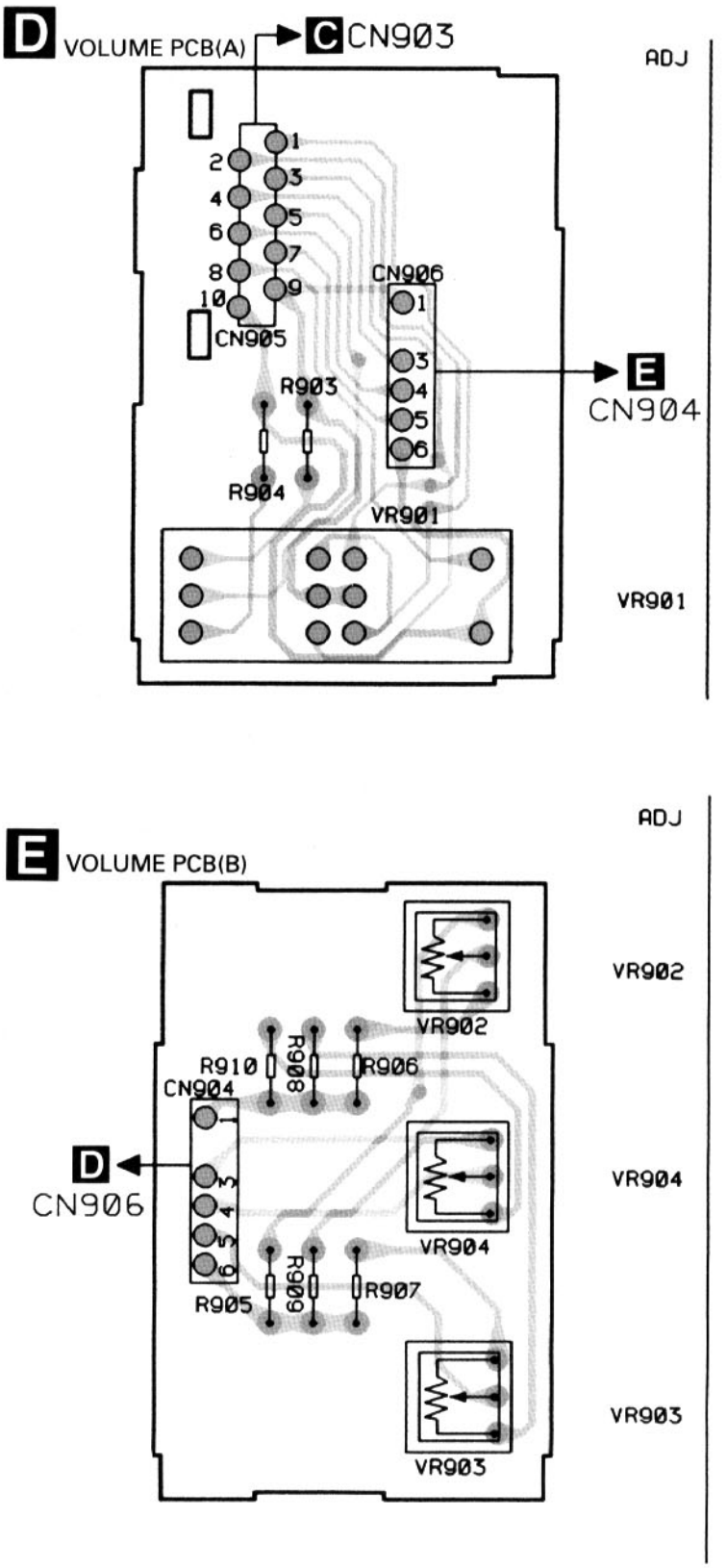
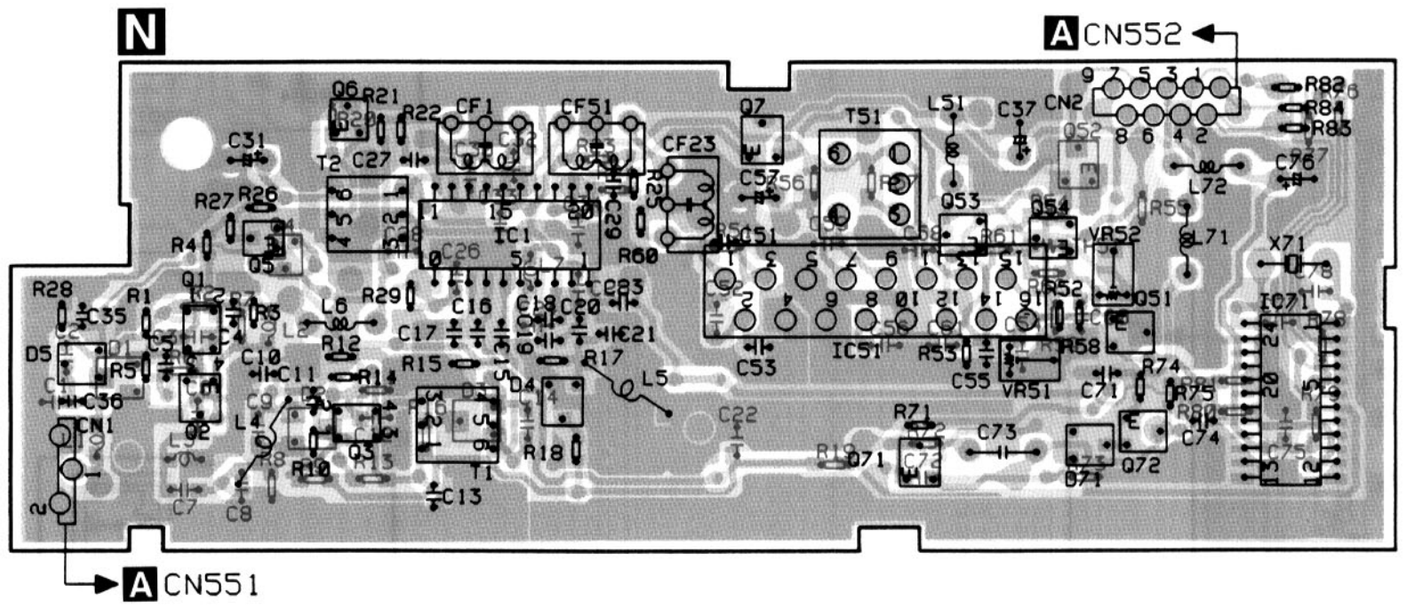

D VOLUME PCB(A)
C CN903
ADJ
1
2
3
4
5
6
7
8
9
10
CN905
CN906
1
3
4
5
6
E
CN904
R903
R904
VR901
VR901
E VOLUME PCB(B)
ADJ
VR902
VR902
R910
R908
R906
CN904
D
CN906
VR904
VR904
R905
R909
R907
VR903
VR903

Fig.17

4.7 SUB TUNER UNIT



ADJ	IC. Q
	Q6
	Q7
	Q52
VR52	Q4 IC1
	Q5 Q53 Q54
	Q51
	IC51
VR51	Q1
	Q72 IC71
	Q2
	Q3 Q71

Fig.18

NOTE:

The parts mounted on this PCB include all necessary parts for several destinations.
For further information for respective destinations, be sure to check with the schematic diagram.

5. ELECTRICAL PARTS LIST

NOTES:

- *Parts whose parts numbers are omitted are subject to being not supplied.*
- *The part numbers shown below indicate chip components.*

Chip Resistor

RS1/○S○○○J,RS1/○○S○○○J

Chip Capacitor (except for CQS.....)

CKS....., CCS....., CSZS.....

F Unit Number : CWE1421
Unit Name : Tuner Unit

=====Circuit Symbol & No. Part Name=====										Part No.
MISCELLANEOUS										
IC	1									PA4023A
IC	2									PA4024A
Q	3									3SK263
Q	31									2SC2712
Q	51									2SK1067
Q	151									DTC124EU
Q	201									FC12
Q	203									DTC124EU
D	4									1SV250
D	5	7	8							KV1410-F1
D	6	201								MA157
D	202									1SV251
D	231									SVC253
L	1									LCTBR12K2125
L	2									CTC1145
L	3									LCTB4R7K2125
L	4									CTC1131
L	5									CTC1147
L	51									LAU150K
L	52									CTC1136
L	202									LAU330K
L	203									CTF1371
L	208									LAU390K
L	209									LAU680K
L	210									CTB1102
L	231									LAU3R3J
T	31									CTE1116
TC	1									CCL1038
CF	25	51	52	53						CTF1290
CF	230									CTF1262
CF	232									CTF1348
X	151									CSS1365
X	231									CSS1111
VR	101									CCP1230
VR	154									CCP1236
VR	156									CCP1234
VR	157									CCP1233
RESISTORS										
R	5									RS1/16S101J
R	6									RS1/16S101J
R	7									RS1/10S331J
R	8	17	18	232						RS1/16S473J
R	9	215								RS1/16S473J
R	10									RS1/16S223J
R	11									RS1/16S823J
R	12									RS1/16S474J
R	15									RS1/16S271J
R	16	52	53	239						RS1/16S104J
R	19									RS1/16S154J
R	20	27	201	209	234					RS1/16S0R0J
R	31									RS1/16S470J
R	32									RS1/16S912J
R	33									RS1/16S912J
R	34	35	54							RS1/16S331J
R	39	233								RS1/16S0R0J
R	51									RS1/16S331J
R	55									RS1/16S102J
R	56									RS1/16S823J
R	61									RS1/16S392J
R	62	152	217							RS1/16S393J
R	103									RS1/16S333J
R	104									RS1/16S334J
R	105									RS1/16S683J
R	107	160								RS1/16S222J
R	151									RS1/10S0R0J
R	155									RS1/16S333J
R	161	214								RS1/16S563J
R	162									RS1/16S225J
R	163									RS1/16S222J
R	164									RS1/16S104J
R	165	208								RS1/16S102J
R	202									RS1/16S223J
R	203									RS1/16S225J
R	204	244								RS1/16S103J
R	205									RS1/16S471J
R	206									RS1/16S220J
R	207									RS1/16S101J
R	220									RS1/10S0R0J
R	231									RS1/16S242J
R	237									RS1/16S103J
R	238									RS1/16S104J
R	240									RS1/16S472J
R	241									RS1/16S202J
R	243									RS1/16S123J
R	247									RS1/10S153J
CAPACITORS										
C	1									CCSRCH220J50
C	3									CCSRCH060D50
C	5	13	17	19	20					CKSRYB222K50
C	7									CKSQYB473K16
C	8	56	65	152	154	160	161	230	241	CKSQYB104K16
C	9									CCSRCH030C50
C	10									CEA010M50LL
C	11	54								CCSRCH470J50
C	12									CCSRCH820J50
C	14									CCSRCH040C50
C	16	232								CCSRCH150J50
C	18	24	31	62	107	213	220	221	233	239 CKSRYB103K25
C	21									CEA100M16LL
C	22									CCSRRH100D50
C	23									CCSRRH120J50

=====Circuit Symbol & No. Part Name=====	Part No.
C 30	CCSRRH201J50
C 32 205 236 244	CKSQYB473K16
C 33	CCSRCH010C50
C 35 61	CCSRCH270J50
C 36	CCSRCH120J50
C 40 53	CKSRYB222K50
C 51 219	CKSRYB223K25
C 52 59 105 201	CKSRYB103K25
C 55	CKSQYB223K25
C 57	CKSRYB472K50
C 58 234	CEA330M10LL
C 63	CEAR15M50LL
C 101	CEA100M10NPLL
C 102	CKSRYB182K50
C 103	CKSQYB682K50
C 104	CEA2R2M50LL
C 106	CCSRCH151J50
C 151	CKSRYB392K50
C 153 157 162	CEA3R3M50LL
C 158	CKSYB474K16
C 159	CEA220M6R3LL
C 163	CKSRYB102K50
C 165 202	CCSRCH100D50
C 203	CKSRYB332K50
C 204	CKSQYB473K16
C 206	CKSQYB103K25
C 207	CCSRCH120J50
C 211	CCSRCH560J50
C 212	CEA101M10LL
C 215	CCSRCH680J50
C 216	CCSRCH101J50
C 217 242	CEAR47M50LL
C 231	CCSRCH330J50
C 235	CKSRYB332K50
C 237	CCSRTH180J50
C 240	CKSYB104K16
C 243	CEAR33M50LL
C 245	CKSQYB183K25
C 246	CKSQYB224K16
C 247	CKSQYB473K16
C 250	CCSRCH030C50

C Unit Number : CWM4355
Unit Name : Key Board Unit

MISCELLANEOUS

Q 901	2SC2712
D 901 LED	AA2222S
D 902 903 904 905 906 907 908	MA151WK
IL 901 902 903 Lamp 80mA/8V	CEL1449
IL 904 905 906 907 Lamp 80mA/8V	CEL1449

RESISTORS

R 901	RS1/10S102J
R 902	RS1/10S821J

CAPACITORS

C 901	CKSQYB103K50

=====Circuit Symbol & No. Part Name=====	Part No.

Tuner Mother Assy
Consists of
Tuner Mother PCB
Conncror PCB
Sub Tuner Unit

A B N Unit Number : CWM4380
Unit Name : Tuner Mother Assy

MISCELLANEOUS

IC 1	LA1193M
IC 51	LA1140B
IC 71 501	LC72146M
IC 401 402 403 404 471 472	NJM4558MD
IC 405	SN761025DL
IC 551	PD6169A
IC 552	PMW001B
IC 601	PD4631A
IC 602	S-29220A
IC 651 UPD72005GC(A)	GGC1191
IC 652	PCA82C250T
IC 701	PD4663A
IC 801	S-80735ANDZI
IC 802	S-80763ANJT
IC 803	S-81250PGPD
Q 1 3 553	3SK195
Q 2 554	2SC2714
Q 4	DTC124EU
Q 5	DTC124EU
Q 6	2SK1067
Q 7	2SA1162
Q 52	2SC2712
Q 53 71 507 651 812 813 851	2SC2712
Q 54	2SC2712
Q 72	2SK208
Q 401	IMH4
Q 471 505 508 551 807	DTC114EK
Q 472	DTC144EK
Q 473	IMH2A
Q 501	DTC144EK
Q 502 503 504	2SB1132
Q 506	2SK208
Q 509	DTA114TK
Q 510	2SB1238
Q 511	2SC2712
Q 555	2SC2712
Q 652 811	2SA1162
Q 701	DTA144EK
Q 801 804 808 816 819	IMX1
Q 802 815 818	2SB1185
Q 803 810 817	DTC114TK
Q 805 809	2SB1260
Q 806	2SA1162
Q 814	2SB1243
D 1	MA157
D 2 3	KV1410-F1
D 4	KV1410-F1
D 5	1SV172
D 71	MA3027(H)
D 401 402 403 404 405 406 407 408	RD10ES(B2)
D 409 410 501	MA151WK
D 471	RD4R7JS(B3)
D 502 503 802 804 806 855	1SS133
D 504	RD2R7M(B2)
D 552	MA157

=====Circuit Symbol & No. Part Name=====											Part No.
D	553										1SV172
D	601										IMN10
D	651	653									RD4R7ES(B3)
D	652	654	803	805	854						RD16ES(B3)
D	655										RD13ES(B2)
D	656										MA151WA
D	801										RD8R2JS(B1)
D	807										ERA15-02VH
D	808										RD7R5JS(B3)
D	809	851									ERA15-02VH
D	853										ERA15-10VH
L	1	2	558		Inductor						LCTBR18K2125
L	3				Inductor						LCTBR12K2125
L	4				Coil						CTC1067
L	5				Coil						CTC1068
L	6	51	71	72	Ferri-Inductor						LAU150K
L	7				Inductor						LCTB150K2125
L	501	502	503	504	Ferri-Inductor						LAU4R7K
L	506	512	551	552	Ferri-Inductor						LAU4R7K
L	601	602			Ferri-Inductor						LAU4R7K
L	507				Inductor						CTF1053
L	508				Inductor						CTF1374
L	509				Coil						CTE1123
L	510				Inductor						LCTBR27K2125
L	511	557			Coil						LCTBR22K2125
L	553				Ferri-Inductor						LAU470K
L	554	555			Inductor						LCTB4R7K2125
L	556				Inductor						LCTBR15K2125
L	559				Inductor						LCTB4R7K2125
L	560				Inductor						LCTBR12K2125
L	651				Ferri-Inductor						LAU220K
L	652				Ferri-Inductor						LAU220K
L	653				Choke Coil						CTH1180
L	701				Ferri-Inductor						LAU4R7K
L	801				Choke Coil						CTH1074
T	1				Coil						CTC1076
T	2				Coil						CTE1066
T	51				Coil						CTC1071
T	551				Coil						CTC1139
TH	51				Thermister(DTN-T203T333KS)						GGC1045
TH	701				Thermistor						CCX1015
CF	1	51			Ceramic Filter						CTF1292
X	71				Crystal Oscillator 2MHz						CSS1334
X	501				Crystal 7.2MHz						CSS1030
X	551				Crystal Resonator 4.332MHz						CSS1056
X	601				Ceramic Oscillator 4.194MHz						CSS1071
X	651				Oscillator 2.00MHz						CSS1393
X	701				Oscillator 8.380MHz						CSS1354
VR	51				Semi-fixed 33kΩ(B)						CCP1232
VR	52				Semi-fixed 2.2kΩ(B)						CCP1225
FU	851				Fuse 5A						CEK1005
					Tuner Unit						CWE1421
EF	851				EMI Filter						CCG1006
AR	501				Arrester						DSP-201M

RESISTORS

R	1	10	28		RS1/16S223J
R	2				RS1/10S823J
R	3	15			RS1/16S104J
R	4	14			RS1/16S683J
R	5				RS1/16S222J
R	6				RS1/10S102J
R	7				RS1/10S221J
R	8	578	587		RS1/10S104J
R	9	56			RS1/10S223J
R	11	54			RS1/10S474J
R	12				RS1/16S271J
R	13	76	77	78	79	RS1/10S473J
R	16				RS1/10S563J
R	18				RS1/16S563J
R	19	55	72	73	RS1/10S102J
R	20				RS1/10S561J
R	21				RS1/16S331J
R	22	58	71	74	75	RS1/16S102J
R	23	24			RS1/10S392J
R	25				RS1/16S472J
R	26				RS1/16S103J
R	27				RS1/16S332J
R	29				RS1/16S151J
R	51				RS1/10S331J
R	53				RS1/16S473J
R	57				RS1/10S472J
R	59	61	62		RS1/10S153J
R	60				RS1/16S0R0J
R	82	83	84		RS1/16S222J
R	403	404			RS1/10S222J
R	405	406			RS1/10S272J
R	407	408	471	501	529	602	672	673	804	824	RS1/10S103J
R	409	410	411	412	413	414	502	525	526	527	RS1/10S102J
R	415	416									RS1/10S273J
R	417	418									RS1/10S101J
R	419	420									RS1/10S361J
R	421	422	423	424							RS1/10S562J
R	425	426	427	428	429	430	431	432	437	438	RS1/10S472J
R	433	434	435	436	441	442	443	444			RS1/10S470J
R	439	440	478	479	489	490	510	511	516	524	RS1/10S472J
R	472										RS1/10S133J
R	473										RS1/10S103J
R	474										RS1/10S682J
R	475	802	803	830							RS1/10S471J
R	476	477									RS1/10S153J
R	480										RS1/10S473J
R	481	482	487	488							RS1/10S123J
R	483	484	485	486	517	530	581	806	815	821	RS1/10S223J
R	503	552	651	652	664	667	723	827			RS1/10S681J
R	504										RS1/10S393J
R	505	506	521	522	561	563	571	604	605	618	RS1/10S222J
R	507	508	509	518	519	559	564	565	568	570	RS1/10S473J
R	512										RS1/10S392J
R	513										RS1/10S223J
R	514										RA4C103J
R	515	554	614	659							RA4C102J
R	520	528									RS1/10S562J
R	523	670	801	828	838						RS1/10S152J
R	531										RD1/4PU180J
R	532										RS1/10S470J
R	533										RS1/10S390J
R	536										RS1/10S472J
R	537										RD1/4PU100J
R	538										RS1/10S103J
R	551	710									RS1/10S105J
R	553										RS1/10S102J
R	555										RS1/10S683J
R	556										RS1/10S333J
R	557										RS1/10S433J
R	558	703	705	719	720	813	816				RS1/10S102J
R	566	567									RA3C681J
R	569	662	663	701							RA3C473J
R	572										RS1/10S273J
R	573	606	607	608	615	616	620	621	627	668	RS1/10S473J
R	574	610									RS1/10S184J

=====Circuit Symbol & No. Part Name=====										Part No.
R	576	609								RA3C222J
R	577									RS1/10S683J
R	579									RS1/10S222J
R	580									RS1/10S102J
R	582									RS1/10S823J
R	584									RS1/10S301J
R	585									RS1/10S151J
R	586									RS1/10S221J
R	603	619	716	811	834					RS1/10S472J
R	611	612	660	661	702	721				RA3C102J
R	613	653	655	722						RA4C681J
R	617	630								RA3C472J
R	622	623	625	626	628	669	706	707	708	711 RS1/10S222J
R	629									RA4C222J
R	631									RA3C223J
R	654	656								RA4C473J
R	657									RA4C472J
R	658									RA4C223J
R	671									RS1/10S822J
R	674									RS1/10S270J
R	704									RA3C102J
R	709	712	717	718	724	725	726			RS1/10S473J
R	713	814	829							RS1/10S222J
R	714									RS1/10S122J
R	715									RS1/10S303J
R	727									RS1/10S102J
R	805	831								RS1/10S331J
R	807									RD1/4PU223J
R	808									RD1/4PU472J
R	809									RD1/4PU223J
R	810									RS1/10S222J
R	812									RS1/10S822J
R	817									RS1/10S473J
R	818									RS1/10S222J
R	819									RS1/10S103J
R	820									RS1/10S102J
R	822	823	825	832	835					RS1/10S223J
R	826									RS1/10S122J
R	833									RS1/10S103J
R	836									RS1/10S681J
R	837									RS1/10S242J
R	839									RS1/10S153J
R	840									RD1/4PU100J
R	851									RD1/4PU112J
R	852									RS1/10S121J
R	853									RS1/10S103J
R	856									RD1/4PU221J
R	857									RD1/4PU222J
R	858	859	860	861	862	863	864	865		RD1/4PU470J

CAPACITORS

C	1								CCSQCH010C50
C	2	22							CKSQYB222K50
C	3	28	30	32	33	58	585		CKSQYB223K25
C	4	17							CCSRCH470J50
C	5	29	51	53	55	71			CKSRYB103K50
C	6								CCSQCH100D50
C	7								CCSQCH390J50
C	8								CCSQCH270J50
C	9								CCSQCH120J50
C	10								CCSRCH030C50
C	11	36							CKSRYB222K50
C	12	574							CCSQCH470J50
C	13	35							CKSRYB223K25
C	14								CCSQPH120J50
C	15	16							CCSRCH050D50

=====Circuit Symbol & No. Part Name=====										Part No.
C	18									CCSRTH150J50
C	19									CCSRTH330J50
C	20									CCSRTH180J50
C	21									CCSRTH120J50
C	23									CKSRYB102K50
C	24	25	52	61	72	75	576	587		CKSQYB103K50
C	26									CKSQYB823K25
C	27									CCSRCH120J50
C	31									CEA3R3M50LL
C	34									CCSQCH080D50
C	37									CEA470M10LL
C	54	60								CCSQCH330J50
C	56									CCSQCH101J50
C	57									CEAR47M50LL
C	59									CCSQCH240J50
C	73									CFTLA474J50
C	74									CCSRCH101J50
C	76									CEA330M10LL
C	77	78								CCSQCH150J50
C	401	402	409	410	471	663				CEA2R2M50LS2
C	403	404	405	406	407	408	657	856		CEA4R7M35LS
C	411	412	415	416	431	432				CEALNP100M10
C	413	414								CKSQYB272K50
C	417	418								CEA4R7M25LS2
C	419	420								CKSQYB392K50
C	421	422	559	577	579					CKSQYB222K50
C	423	424								CKSQYB152K50
C	425	426								CEALNP1R5M50
C	427	428	437	438	439	440	441	442	443	444 CCSQCH101J50
C	429	430								CKSQYB184K16
C	433	434	435	436	473	519	558	606	703	810 CEA100M16LS2
C	445	446	447	448	449	450	451	452	478	487 CKSQYB102K50
C	453	454	455	456	457	458	459	460		CEAS100M50
C	461	462								CKSQYB334K16
C	472									CKSQYB153K25
C	474	477	503	524	528	529	530	533	555	565 CKSQYB103K50
C	475									CEA101M10LS
C	476	483	484	808						CEA330M10LS
C	479									CEALNP4R7M16
C	480	522	668	669						CCSQCH101J50
C	481	482								CCSQCH470J50
C	501	512	609	610	653	654	655	656	701	813 CKSQYB102K50
C	502									CKSQYB223K25
C	504									CKSQYB102K50
C	505	508	509	511	513	515	516	517	518	526 CKSQYB223K25
C	507	563								CKSQYB104K16
C	510	514	623							CKSQYB471K50
C	520	521	673	674						CCSQCH270J50
C	523									CEAR47M50LS2
C	525				4.7μF/10V					CCH1280
C	527									CFTNA104J50
C	531	532								CCSQCH100D50
C	551	552								CCSQCH220J50
C	553	557	569	570	572	611	622	672	702	803 CKSQYB223K25
C	556									CCSQCH102J50
C	560									CKSQYB682K50
C	561	562	802	816						CKSQYB472K50
C	566	575	601	602	603	604	607	612	613	614 CKSQYB103K50
C	567									CKSQYB104K16
C	568									CKSQYB103K50
C	571	573								CEA100M16LS2
C	581									CCSQCH100D50
C	582									CCSQCH180J50
C	583									CCSQCH180J50
C	584									CCSQCH220J50

=====Circuit Symbol & No.	Part Name=====	Part No.
C 586		CKSQYB103K50
C 605	0.047F/5.5V	CCL1040
C 608		CKSYB223K25
C 615 616 617 618 619 620 621 624 651 658		CKSQYB103K50
C 652		CASAQ4R7M10
C 659 660 661 662 664 665 666 704 814 817		CKSQYB103K50
C 667		CKSQYB223K25
C 671		CEAS331M6R3
C 801 815 818		CEAS101M10
C 804		CEAS471M25
C 805 809 811 812 851		CKSQYB223K25
C 806		CEA330M25LS
C 807		CEA4R7M35LS
C 819		CKSQYB103K50
C 852 853 854 855		CEA100M16LS2
C 857 858 859 860 861 862 863 864		CCSCH102J50
C 865		CKSYB103K50

Volume Unit
Consists of
Volume PCB(A)
Volume PCB(B)

D E Unit Number : CWM4511
Unit Name : Volume Unit

MISCELLANEOUS

VR 901	Volume 50kΩ(B)	CSD1031
VR 902 903 904	Volume 50kΩ(B)	CCS1089

RESISTORS

R 903 904 905 906 907 908 909 910	RD1/4PU182J

G Unit Number : CWX2096
Unit Name : Control Unit

MISCELLANEOUS

IC 101		UPC2572GS
IC 201		UPD63702GF
IC 301		XLA6997FP
IC 302		XLA6285FP
IC 601		TA2063F
IC 701		PQ05TZ51
Q 101		2SD1664
Q 102		UMD2N
Q 601 602		2SD1781K
Q 603		2SB709A
D 601		MA151WA
D 701 702		1SR154-400
D 801 802	LED	CL200IRX
X 201	Ceramic Resonator 16.93MHz	CSS1363
S 801 802	Switch(Home, Clamp)	CSN1028

RESISTORS

R 101	RS1/8S100J
R 102	RS1/8S120J
R 103	RS1/16S102J
R 104	RS1/16S822J
R 105	RS1/16S682J
R 106	RS1/16S183J
R 107	RS1/16S822J
R 108	RS1/16S333J
R 109	RS1/16S683J
R 110	RS1/16S134J
R 111	RS1/16S273J
R 112	RS1/16S222J
R 113 114 607	RS1/16S103J
R 115	RS1/16S102J
R 116 117	RS1/16S163J

=====Circuit Symbol & No.	Part Name=====	Part No.
R 201		RS1/16S104J
R 202		RS1/16S473J
R 304 501		RS1/16S0R0J
R 505		RS1/16S102J
R 507		RA4C102J
R 508		RA4C681J
R 601 602		RS1/16S102J
R 603 604		RS1/16S223J
R 605 606		RS1/16S162J
R 801 802		RS1/8S751J

CAPACITORS

C 101 601 703		CEV101M6R3
C 102		CKSQYB104K16
C 103		CEV470M6R3
C 104		CKSYB334K16
C 105		CCSRCH330J50
C 106 304		CKSRYB103K25
C 107 603 604		CEV4R7M35
C 108		CKSQYB273K50
C 109		CCSRCH101J50
C 110 202		CKSQYB104K16
C 111		CKSRYB332K50
C 112		CKSQYB473K16
C 113		CKSRYB103K25
C 114		CKSRYB391K50
C 115		CCSRCH121J50
C 116		CKSRYB682K25
C 117		CKSRYB333K16
C 118 201		CKSYB334K16
C 119		CKSYB334K16
C 120 121 702		CKSYB334K16
C 122 124		CKSQYB104K16
C 123		CKSRYB472K50
C 125		CCSRCH060D50
C 126		CKSRYB153K25
C 127		CCSRCH102J25
C 203		CKSQYB104K16
C 303		CEV470M16
C 305 306		CKSRYB103K25
C 307		CEV100M25
C 502		CKSRYB471K50
C 602		CKSQYB104K16
C 605 606		CKSRYB152K50
C 607		CEV220M6R3
C 701	22μF/6.3V	CCH1233
C 901 903		CCSRCH471J50
C 902		CCSRCH271J50
C 904		CCSRCH101J50

H Unit Number : CWM4527
Unit Name : Deck Unit

MISCELLANEOUS

IC 251		CXA1910Q
IC 351		PA2020A
Q 351		2SB1260
Q 352		2SC4102
D 351		MA141K
VR 301 302	Semi-fixed 22kΩ(B)	CCP1129

RESISTORS

R 255 256	RS1/16S181J
R 271	RS1/16S183J
R 272	RS1/16S183J
R 273 274 275 276 322 351 352 353 354	RS1/16S102J
R 277 281 282 283 284 373 374 375	RS1/8S0R0J

=====Circuit Symbol & No. Part Name=====										Part No.
R	278	301	302	371	404					RS1/16S0R0J
R	323									RS1/16S102J
R	355									RS1/10S274J
R	356									RS1/10S202J
R	357									RS1/10S472J
R	358	359								RS1/10S103J
R	360									RS1/10S102J
R	361									RS1/10S622J
R	372									RS1/10S0R0J
R	401									RS1/16S821J
R	402									RS1/16S392J
R	403									RS1/16S105J

CAPACITORS

C	251	252	253	254						CKSRYB391K50
C	255	256								CKSRYB103K50
C	257	258								CEV470M6R3
C	271	307	308							CKSQYB104K16
C	272	301	302							CEV100M16
C	303	304								CEV010M50
C	351									CKSYB224K25
C	352									CKSQYB392K50
C	353	356								CKSQYB103K50
C	354									CKSQYB473K50
C	355									CKSYB104K50
C	401									CCSRCH151J50
C	402									CKSYB684K16
C	403									CKSYB333K25
C	404									CKSRYB333K16

Unit Number :
Unit Name : P.C.Board Unit

S	1	2		Switch (70μS,Load)	ESG1004
EGN	1			Photo-Interrupter	EGN1005
R	1				RD1/4HM181J

Unit Number :
Unit Name : Reel PCB

EGN	2	3		Photo-Reflector	EGN1004

Unit Number :
Unit Name : Detector PCB

Q	1	2		Photo Transistor	CPT-230S-X

Miscellaneous Parts List

				Pickup Unit(Service)	CXX1230
M	1			Motor Unit(Spindle)	CXA8912
M	2			CRG Motor Unit(Carriage)	CXA8986
M	3			Load Motor Unit(Loading)	CXA8702
M	1			Motor Unit (Main)	EXA1381
M	2			Motor Unit (Sub)	EXA1382
HD	1			Head Assy	EXA1488

6. ADJUSTMENT

6.1 CHECKING THE GRATING

● Checking the Grating After Changing the Pickup Unit(Service)

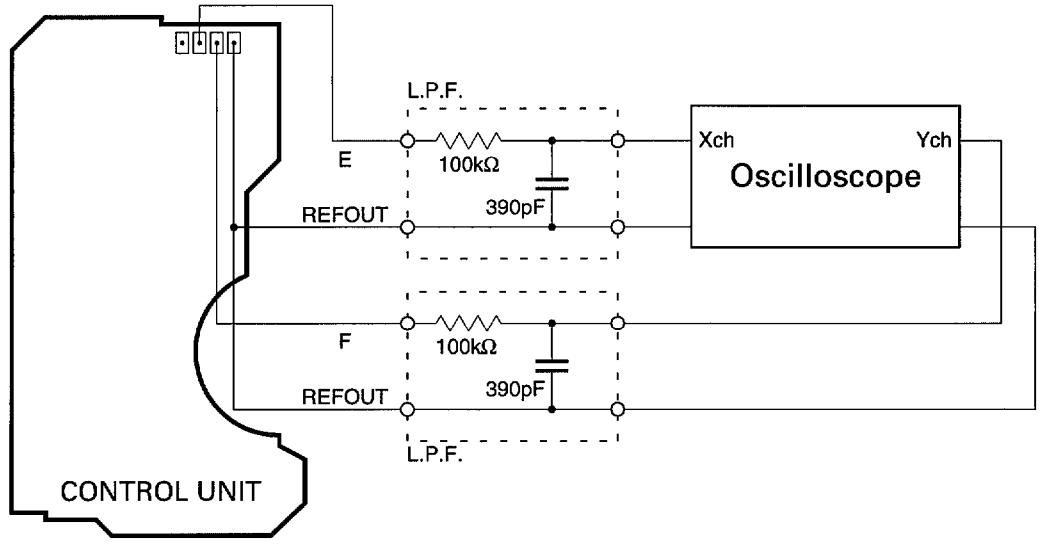
·Note :
Unlike previous CD mechanism modules the grating angle of the PU unit cannot be adjusted after the PU unit is changed. The PU unit in the CD mechanism module is adjusted on the production line to match the CD mechanism module and is thus the best adjusted PU unit for the CD mechanism module. Changing the PU unit is thus best considered as a last resort. However, if the PU unit must be changed, the grating should be checked using the procedure below.

·Purpose :
To check that the grating is within an acceptable range.

·Symptoms of Mal-adjustment :
If the grating is off by a large amount symptoms such as being unable to close tracking, being unable to perform track search operations, or track searching taking a long time, may appear.

·Method :

·Measuring Equipment	·Oscilloscope, Two L.P.F.
·Measuring Points	·E, F, REFOUT
·Disc	·ABEX TCD-784
·Mode	·TEST MODE



·Checking Procedure

1. In test mode, load the disc and switch the 5V regulator on.
2. Using the **UP** and **DOWN** buttons, move the PU unit to the innermost track.
3. Press key **5** to close focus, the display should read "91". Press key **2** to implement the tracking balance adjustment the display should now read "81". Press key **5** 4 times. The display will change, returning to "81" on the fourth press.
4. As shown in the diagram above, monitor the LPF outputs using the oscilloscope and check that the phase difference is within 75° . Refer to the photographs supplied to determine the phase angle.
5. If the phase difference is determined to be greater than 75° try changing the PU unit to see if there is any improvement. If, after trying this a number of times, the grating angle does not become less than 75° then the mechanism should be judged to be at fault.

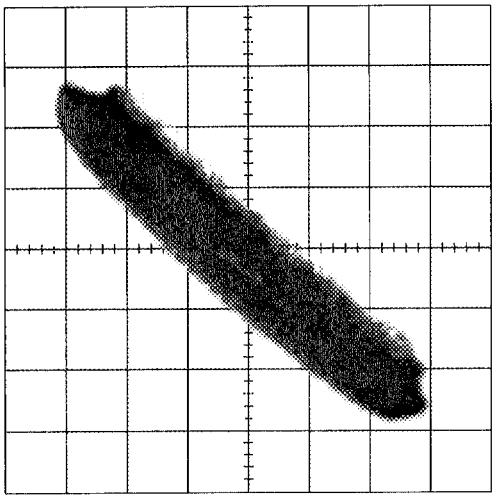
·Note
Because of eccentricity in the disc and a slight misalignment of the clamping center the grating waveform may be seen to "wobble" (the phase difference changes as the disc rotates). The angle specified above indicates the average angle.

·Hint
Reloading the disc changes the clamp position and may decrease the "wobble".

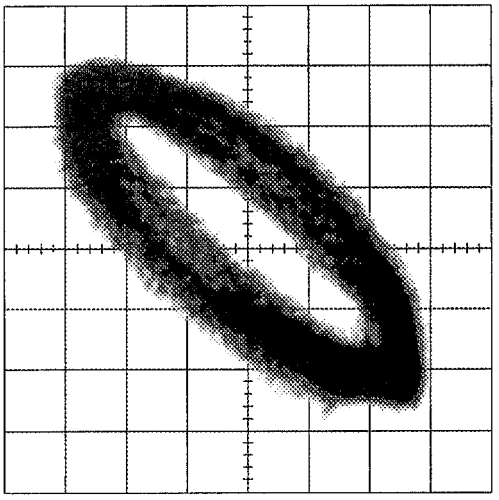
Grating waveform

Ech → Xch 20mV/div, AC
Fch → Ych 20mV/div, AC

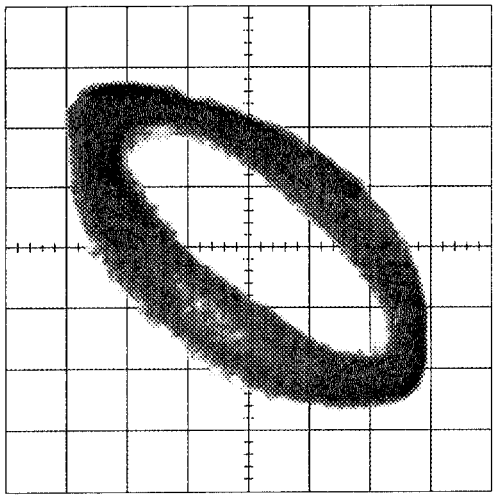
0°



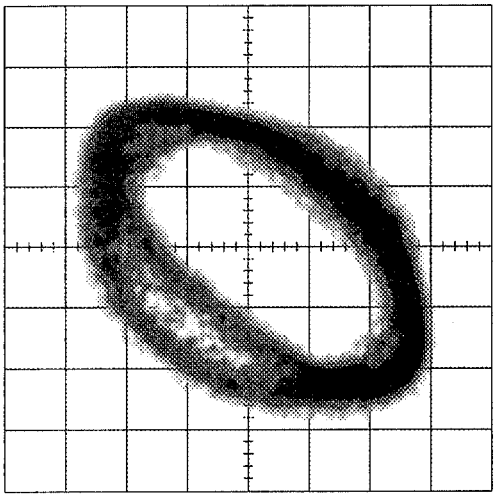
30°



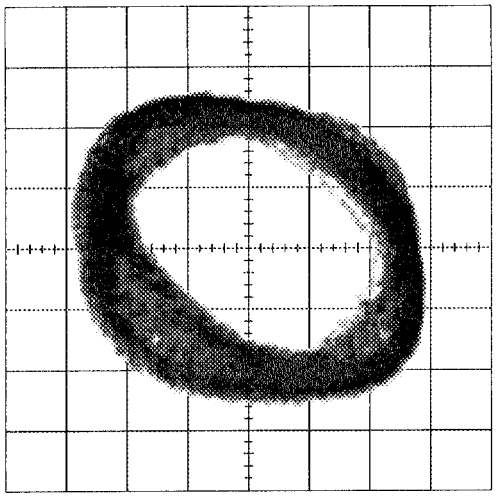
45°



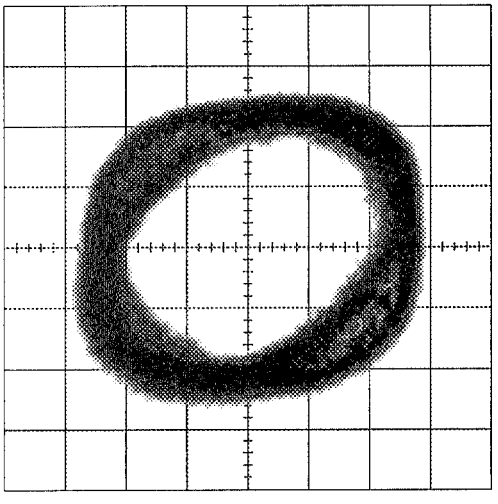
60°



75°



90°



6.2 TUNER/AUDIO ADJUSTMENT

● **Connection Diagram**

NOTE:

Select C1 so that total capacity of 80pF is attained from the direction of the receiver jack.

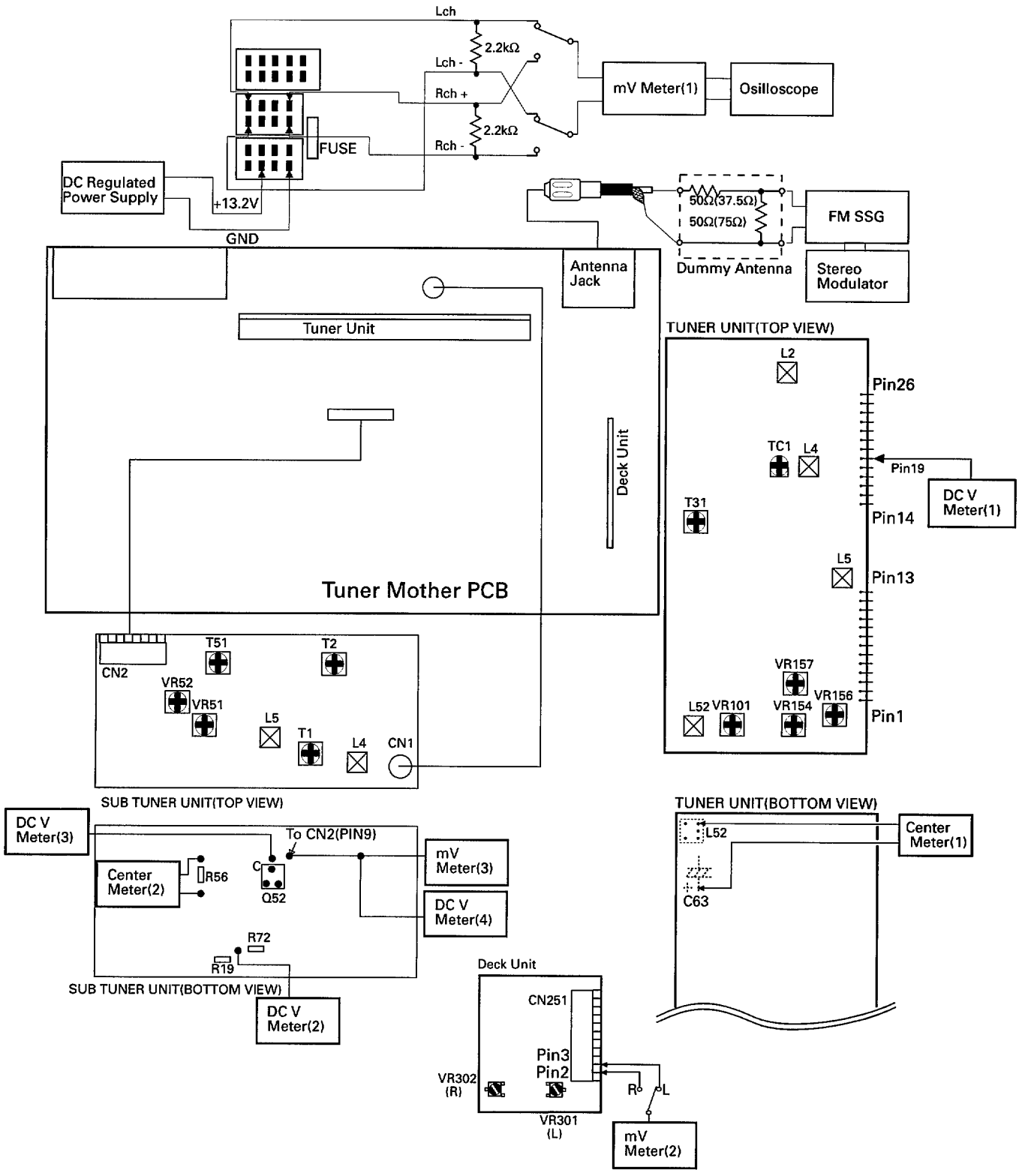


Fig.19

FM ADJUSTMENT

NOTE:Before proceeding to further adjustments after switching power ON, let the tuner run for ten minutes to allow the circuits to stabilize.

Modulation M : MONO MOD., 400Hz, 30%(22.5kHz Dev.)
S : STEREO MOD., 1kHz, L or R=30%(20.25+7.5kHz Dev.)

	No.	FM SSG		Displayed	Adjustment	Adjustment Method
		Frequency(MHz)	Level(dBf)	Frequency(MHz)	Point	(Switch Position)
TUN Volt	1	108.0	—	108.0	L5	DC V Meter(1) : 6.5V
Center	1	98.1 M	65	98.1	L52	Center Meter(1) : 0
ANT	1	89.9 M	8	89.9	L2	mV Meter(1) : Maximum
RF coil	1	89.9 M	8	89.9	L4	mV Meter(1) : Maximum
RF trimmer	1	129.3 M	60–80	107.9	TC1	mV Meter(1) : Minimum
		Repeat the above two procedures until both are OK'd.				
IFT	1	98.1 M	5	98.1	T31	mV Meter(1) : Maximum
Sepa-ration	1	98.1 S	65	98.1	VR101	mV Meter(1) : Separation Maximum
ARC	1	98.1 S	40	98.1	VR154	mV Meter(1) : Separation5dB
Soft Mute	1	98.1 M	15	98.1	VR157	mV Meter(1) : –3dBs (STEREO MODE)
Search	1	98.1 M	25	98.1	VR156	DC V Meter(1) : Approx.4V (STEREO MODE)

DOLBY NR ADJUSTMENT

No.	Test Tape	Adjustment Point	Adjustment Method (Switch Position)
1	NCT-150 (400Hz, 200nwb/m)	VR301(Lch), VR302(Rch)	mV Meter(2) : -6.0dBs±1.0dBs (DOLBY NR switch : OFF)

SUB TUNER ADJUSTMENT

Modulation M : MONO MOD., 400Hz, 30%(22.5kHz Dev.)

	No.	FM SSG		Displayed	Adjustment	Adjustment Method
		Frequency(MHz)	Level(dBf)	Frequency(MHz)	Point	(Switch Position)
TUN Volt	1	108.0		108.0	L5	DC V Meter(2) : 6.5V
Center	1	98.1 M	65	98.1	L51	Center Meter(2) : 0
ANT	1	98.1 M	13	98.1	L4	DC V Meter(4) : Maximum
RF	1	98.1 M	13	98.1	T1	DC V Meter(4) : Maximum
IFT	1	98.1 M	13	98.1	T2	DC V Meter(4) : Maximum
Search	1	98.1 M	16	98.1	VR51	DC V Meter(3) : 2.5±1.0V
S meter	1	98.1 M	35	98.1	VR52	DC V Meter(4) : 1.75V

7. GENERAL INFORMATION

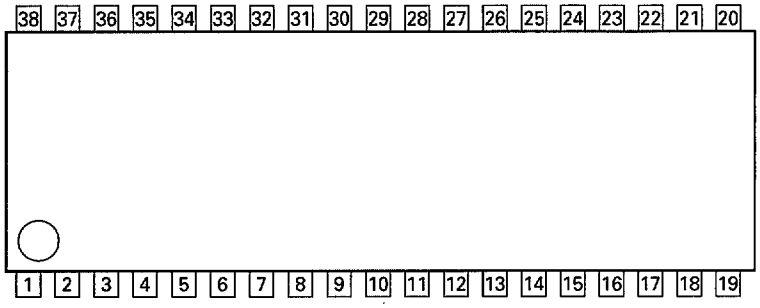
7.1 PARTS

7.1.1 IC

● **Pin Functions (UPC2572GS)**

Pin No.	Pin Name	I/O	Function and Operation
1	EFM-IN	I	EFM comparator input
2	RFO	O	AGC amplifier output
3	C. AGC		Connects AGC peak detection condenser
4	RF-IN	I	RF signal DC component cut input
5	RF-OUT	O	RF amplifier output
6	RF-	I	RF amplifier inverted input
7	C1, 3T		Connects RF3T component detection condenser
8	C2, 3T		Connects RF3T component detection condenser
9	Vcc		Power supply
10	A	I	A signal input
11	C	I	C signal input
12	B	I	B signal input
13	D	I	D signal input
14	F	I	F signal input
15	E	I	E signal input
16	PD	I	APC amplifier input
17	LD	O	APC amplifier output
18	LDON	I	Laser diode ON/OFF input
19	VREF-OUT	O	Reference voltage output
20	VREF-IN	I	Reference voltage input
21	DET-OUT	O	Vibration detection circuit output
22	DET-IN	I	Vibration detection circuit input
23	TE-OUT2	O	Tracking error amplifier output (fourfold gain)
24	TE-OUT1	O	Tracking error amplifier output (single fold gain)
25	TE-	I	Tracking error amplifier inverted input
26	GND		GND
27	FE-	I	Focus error amplifier inverted input
28	FE-OUT	O	Focus error amplifier output
29	C.FE	I	Focus error signal DC component cut input
30	3T-OUT	O	RF3T component output
31	MIRR	O	MIRR signal output
32	RFOK	O	RFOK signal output
33	DEFECT	O	DEFECT signal output
34	C. DEF		Connects DEFECT signal detection condenser
35	EFM-OUT	O	EFM comparator output
36	ASY	I	EFM comparator level input
37	TE-BAL	I	Tracking balance control
38	FE-BAL	I	Focus balance control

UPC2572GS

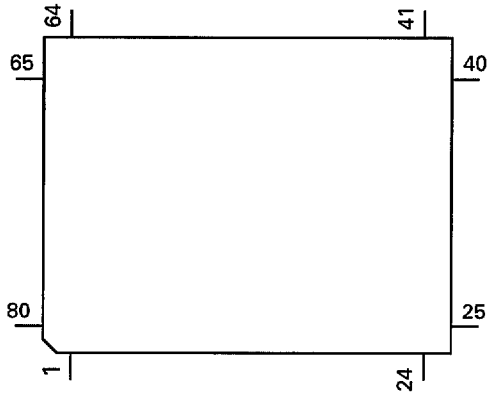


● Pin Functions (UPD63702GF)

Pin No.	Pin Name	I/O	Function and Operation
1	D.VDD		Supplies current of positive voltage to the logic circuits
2	$\overline{RST}$	I	System reset input pin
3	AO	I	Microcomputer interface AO="L": $\overline{STB}$ active and set to address register AO="H": $\overline{STB}$ active and set to parameter
4	$\overline{STB}$	I	Signal to latch serial data within the LSI
5	$\overline{SCK}$	I	Clock input pin to input and output serial data
6	SO	O	Outputs serial data and status signal
7	SI	I	Serial data input pin
8	D.GND		Logic circuit GND
9	X.GND		Crystal oscillation circuit GND
10	XTAL	I	Crystal oscillator connection pin
11	$\overline{XTAL}$	O	Crystal oscillator connection pin
12	X.VDD		Supplies current of positive voltage to the crystal oscillation circuit
13	DA.VDD		Supplies current of positive voltage to the D/A converter
14	R+	O	Right channel analog audio data output pin
15	R-	O	Right channel analog audio data output pin
16,17	DA.GND		D/A converter GND
18	L-	O	Left channel analog audio data output pin
19	L+	O	Left channel analog audio data output pin
20	DA.VDD		Supplies current of positive voltage to the D/A converter
21	D.VDD		Supplies current of positive voltage to logic circuit
22	FLAG	O	Flag output pin to indicate that audio data currently being output consists of noncorrectable data
23	WDCK	O	Pin to output double the frequency of LRCK
24	C16M	O	Pin to output the clock
25	EMPH	O	Output pin for the pre-emphasis data in the sub-Q code
26	DIN	I	Input pin for serial audio data
27	DOUT	O	Output pin for the serial audio data
28	SCKO	O	Output pin for the clock for the serial audio data
29	LRCK	O	Signals to distinguish the right and left channels of the audio data output from DOUT. Frequency is 44.1kHz at 50% duty at normal regeneration
30	TX	O	Output pin for the digital audio interface data
31	CTLV	I	Oscillation control pin for high-frequency clock generation VCO used for the digital PLL upon regeneration at fast speed of 2- or 4-fold
32	POUT	O	Output point for phase comparison
33	D.GND		GND for the logic circuit
34	VCO	I	Input pin for the inverter
35	$\overline{VCO}$	O	Output pin for the inverter
36	D.VDD		Supplies current of positive voltage to the logic circuit
37	PLCK	O	Pin for monitoring the bit clock
38	LOCK	O	Indicates "H" when the synchronized pattern detection signal matches the frame counter output at the EFM recovery modulation, and "L" when they don't match
39	WFCK	O	Minute-cycle signal for the bit clock, the signal indicates the cycle of 1 frame (approx. 7.35kHz)
40	RFCK	O	Minute-cycle signal for the clock, the signal indicates cycle of 1 frame (approx. 7.35kHz)
41	D.GND		GND for the logic circuit
42,43	TEST0,1	I	Test pins
44,45	TM2, TM4	I	Pins for controlling regeneration at fast speed of 2- or 4-fold
46-49	T4-T7	I	Test pins
50,51	C1D1, C1D2	O	Output pin for indicating the C1 error correction results
52-54	C2D1-C2D3	O	Output pin for indicating the C2 error correction results
55	D.VDD		Supplies current of positive voltage to the logic circuit
56	SFSY	O	Outputs 1 word of the subcode. Generally, 1 cycle is approx 136 micro seconds
57	SBSY	O	The signal indicates the beginning of the subcode block. The SFSY signal is output at high level every 98 times

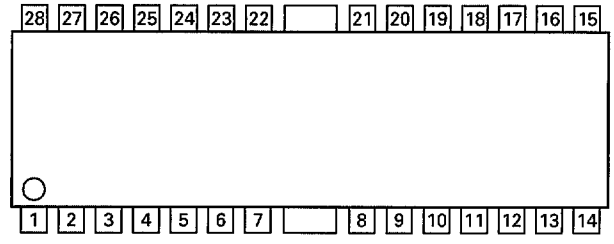
Pin No.	Pin Name	I/O	Function and Operation
58	SBSO	O	Output pin for the subcode data
59	SBCK	I	Input pin for the clock signal for read-out of the subcode data
60	A.GND		GND for the analog circuit
61	MD	O	Output pin for the spindle drive
62	SD	O	Output pin for the sled drive
63	TD	O	Output pin for the tracking drive
64	FD	O	Output pin for the focus drive
65	FBAL	O	Output pin for the focus balance control
66	TBAL	O	Output pin for the tracking balance control
67	A.VDD		Supplies current of positive voltage to the analog circuit
68	TBC	I	Switches coefficient banks for the tracking filter
69	EFM	I	Input pin for the EFM signal
70	HOLD	I	Input pin for the hold control signal
71	RFOK	I	Input pin for the RFOK signal
72	MIRR	I	Input pin for the MIRR signal
73	A.GND		GND for the analog circuit
74,75	VR2,1	I	The signal input through these pins is digitized to 8-bit by the A/D converter, which by operation of the assigned register, can be read into the microcomputer
76	FE	I	Inputs a focus-error signal from the RF amplifier
77	TE	I	Inputs a tracking-error signal from the RF amplifier
78	TEC	I	Input pin for the tracking comparator
79	REFOUT	O	Output point for midpoint potential for the A/D converter for the LSI portion
80	A.VDD		Supplies current of accurate voltage to the analog circuit

*UPD63702GF

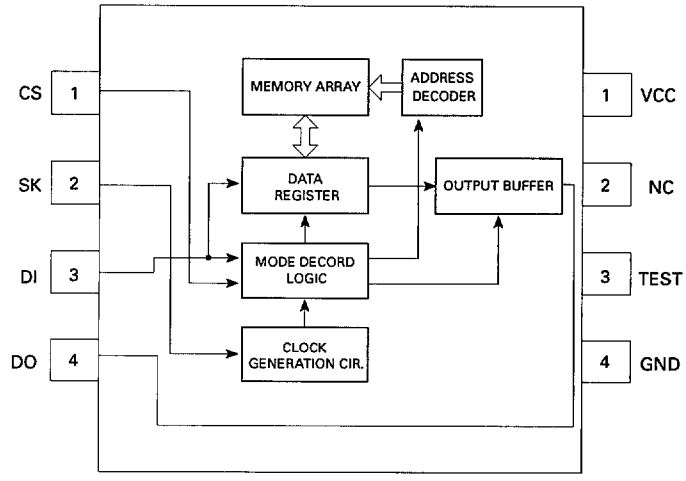


IC's marked by are MOS type.*
Be careful in handling them because they are very liable to be damaged by electrostatic induction.

XLA6997FP



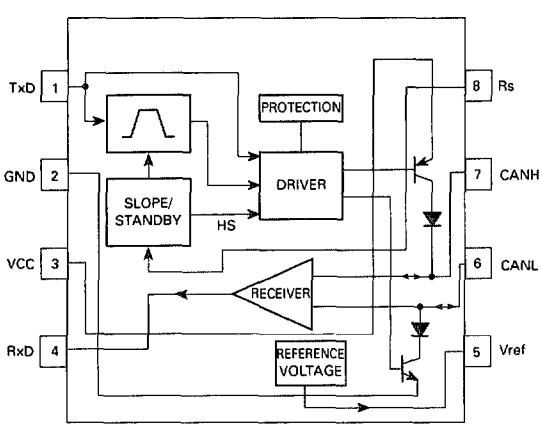
*S-29220A



● Pin Functions (XLA6997FP)

Pin No.	Pin Name	I/O	Function and Operation
1	OUT1-A	O	CH1 driver output
2	OUT1-B	O	CH1 driver output
3	IN1	I	CH1 input
4	IN1'	I	CH1 gain adjustment input
5	REG-B		PowTr base connection pin for regulator
6	REG OUT	O	Regulator output PowTr collector connection pin
7	REG GND		Regulator GND/Common circuit GND
8	BIAS	I	BIAS input
9	MUTE		Mute control pin
10	REG SW		Regulator switch pin
11	TEMP MON		Humidity monitor pin
12	IN2	I	CH2 input
13	OUT2-B	O	CH2 driver output
14	OUT2-A	O	CH2 driver output
15	GND		GND
16	OUT3-A	O	CH3 driver output
17	OUT3-B	O	CH3 driver output
18	IN3''		CH3 gain adjustment pin
19	IN3'		CH3 gain adjustment pin
20	IN3	I	CH3 input
21,22	VCC		VCC
23	IN4	I	CH4 input
24	IN4'		CH4 gain adjustment pin
25	IN4''		CH4 gain adjustment pin
26	OUT4-B	O	CH4 driver output
27	OUT4-A	O	CH4 driver output
28	GND		GND

*PCA82C250T



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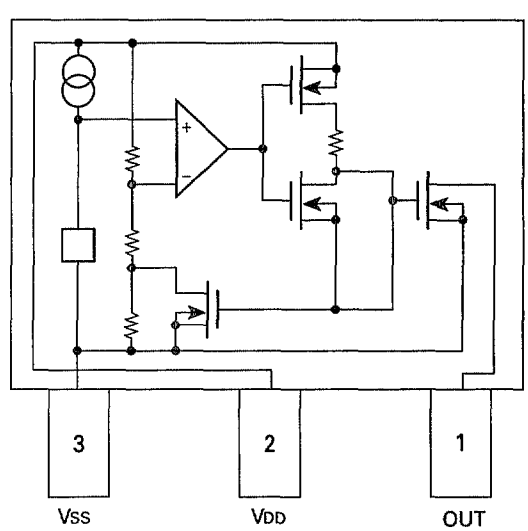
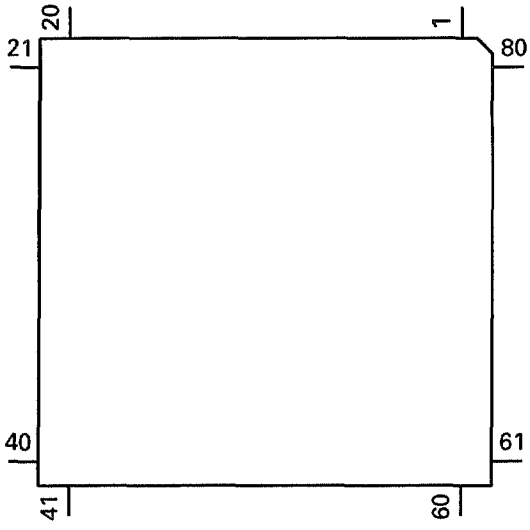


● **Pin Functions(PD4631A)**

Pin No.	Pin Name	I/O	Format	Function and Operation
1	MOD	I		Destination sense analog input
2	RSL	I		Sub tuner signal level analog input
3	RSD	I		Sub tuner station detector input
4	AVSS			A/D GND
5	ILLCON	O	C	Illumination power analog output
6	DINJ	O	C	Disc set indicator control output
7	AVREF1			(D/A converter standard voltage)
8	PDI	I		PLL data input
9	PDO	O	C	PLL data output
10	$\overline{\text{PCK}}$	O	C	PLL clock output
11	RDI	I		Serial data input for RDS IC
12	RDO	O	C	Serial data output for RDS IC
13	$\overline{\text{RCK}}$	O	C	Serial clock output for RDS IC
14	$\overline{\text{BSRQ}}$	I		P-BUS serial pole request input
15	BRXEN	I/O	/C	P-BUS reception enable input/output pin
16	$\overline{\text{BRST}}$/TSI	O	C	P-BUS reset output
17	BSIO/TSO	I/O	/C	P-BUS serial data input/output
18	BSCK/TCK	I/O	/C	P-BUS serial clock input/output
19–26	D0-7	I/O	/C	Address/data
27	A8	O	C	Address
28	$\overline{\text{CS}}$	I		CAN BUS chip select
29	$\overline{\text{RST}}$	O	C	CAN BUS IC reset
30–32	VOL1-3	I		Rotary encoder input
33	VSS			GND
34	MS	I		Cassette mechanism MS sense input
35	$\overline{\text{MTL}}$	I		Cassette mechanism METAL detector input
36	$\overline{\text{LOAD}}$	I		Cassette mechanism Loading detection input
37	POS	I		Cassette mechanism position sense input
38	RES	I		Cassette mechanism reverse end sense input
39	NES	I		Cassette mechanism normal end sense input
40	$\overline{\text{RD}}$	O	C	Read signal input
41	$\overline{\text{WR}}$	O	C	Write signal input
42	$\overline{\text{WAIT}}$	I		Outside wait signal input
43	ASTB	O	C	Timing output for extension RAM
44	RPCE	O	C	RDS PLL chip enable
45	B.C/TUMUT	O	C	Tuner mute output/Dolby V output
46	$\overline{\text{TELON}}$	O	C	Select output of outside input
47	SD	I		Station detector input
48	SMUT	O	C	Mute output
49	SYSPW	O	C	System power supply control output
50	AMPB	O	C	Amplifier power output
51	ECE	O	C	EEPROM enable output
52	ECK/VCK	O	C	EEPROM/E.VOL clock output
53	EDO/VDT	O	C	EEPROM/E.VOL data output
54	EDI	I		EEPROM data input
55	PCE/VST	O	C	PLL chip enable/E.VOL strobe output
56	NC			Not used
57	$\overline{\text{RRST}}$	O	C	Reset output for RDS IC
58	RSEL	O	C	Select output for RDS IC
59	RRDY	I		Ready input from RDS IC
60	$\overline{\text{RESET}}$	I		Reset input
61	INT	I		CAN BUS squeeze signal input
62	BSENS	I		Back up power sense input
63	$\overline{\text{IGSEN}}$	I		ACC power sense input
64	$\overline{\text{POWER}}$	I		CD +5V control
65	TELIN	I		Telephone mute input
66	$\overline{\text{CSEJ}}$	I		Tape eject SW input

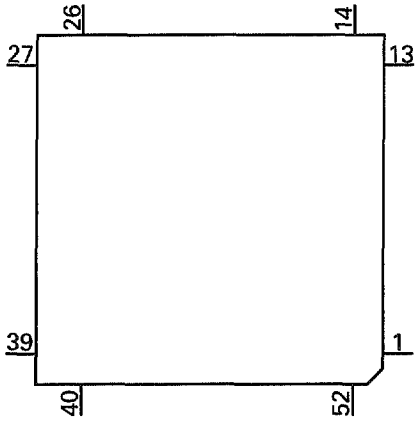
Pin No.	Pin Name	I/O	Format	Function and Operation
67	VOL0	I		Rotary encoder edge input
68	VDD			Power supply
69	X2			Crystal oscillator connection pin
70	X1			Crystal oscillator connection pin
71	IC			GND
72	XT2			Sub clock
73	TESTIN	I		Test program mode input
74	AVDD			Positive power supply terminal for analog circuit
75	AVREF0			GND
76	SL	I		Signal level input
77	BASS	I		A/D converter input from BASS volume
78	TRE	I		A/D converter input from TREBLE volume
79	BAL	I		A/D converter input from BALANCE volume
80	FAD	I		A/D converter input from FADER volume

*PD4631A

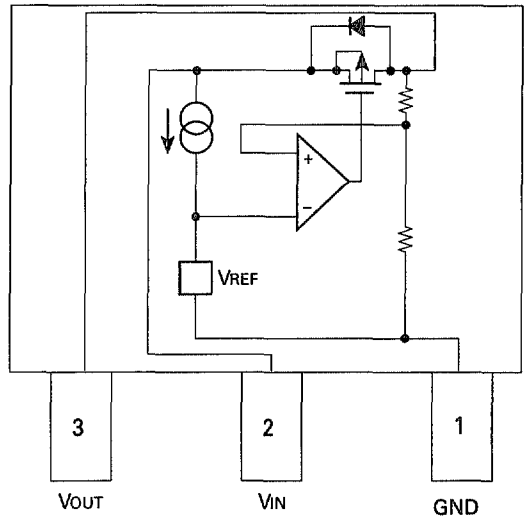


Format	Meaning
C	C MOS

*GGC1191(UPC72005GC(A))



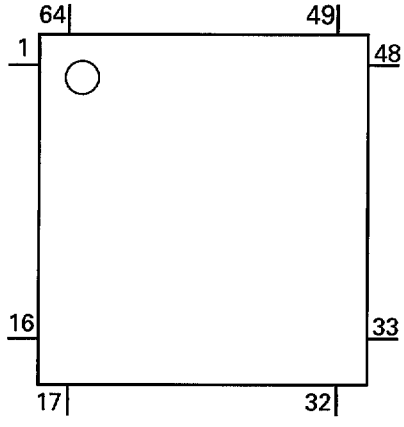
*S-81250PGPD



● Pin Functions GGC1191(UPC72005GC(A))

Pin No.	Pin Name	I/O	Function and Operation
1	RX1	I	Input data of CAN BUS
2	RX0	I	Input data of CAN BUS
3	AVSS		A/D GND
4	AVDD		Positive power supply terminal for analog circuit
5	TX1	O	Output data of CAN BUS
6	TX0	O	Output data of CAN BUS
7	VSS		GND
8	VDD		Power supply
9	BSSEL	I	Select port for inter face
10	$\overline{WAIT}$	O	Memory access WAIT signal
11	ASTB	I	Memory access address T signal
12	$\overline{RD}$	O	Memory access WAIT signal
13	$\overline{WR}$	O	Memory access WAIT signal
14	$\overline{CS}$	I	Memory access chip select pin
15	A8	I	Address line bit 8
16–23	D7-0	I/O	Address data bit 7
24–27	KDT0-3	I	Key data input
28–31	KST0-3	O	Key strobe output
32	VDD		Power supply
33	VSS		GND
34	$\overline{F}$/R	O	Cassette mechanism head forward/reverse select output
35	PLAY	O	Tape MS filter select output
36	NR	O	NR output
37	SC2	O	Cassette mechanism sub motor control output
38	SC1	O	Cassette mechanism sub motor control output
39	CM	O	Cassette mechanism capstan motor control output
40	$\overline{STBY}$	I	Stand-by input terminal
41	WKUP	O	BUS wake up output
42	INT	O	Squeeze signal output
43	IC		GND
44	$\overline{RESET}$	I	Reset input
45	VDD		Power supply
46	VSS		GND
47	X1		Crystal oscillator connection pin
48	X2		Crystal oscillator connection pin
49	CVSS		Clock VSS
50	CVDD		Clock VDD
51	$\overline{REL}$	I	Cancellation port of stop mode
52	CKSEL	I	Master clock frequency select input

*PD4663A



● **Pin Functions(PD4663A)**

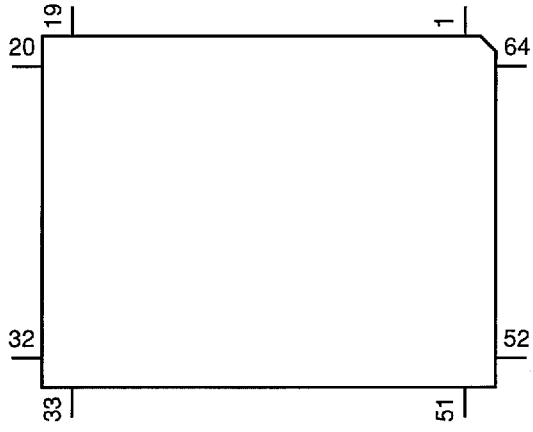
Pin No.	Pin Name	I/O	Format	Function and Operation
1	NC			Not used
2	$\overline{\text{XRST}}$	O	C	CD LSI reset output
3–7	NC			Not used
8	$\overline{\text{CLAMP}}$	I		Disc clamp sense input
9	VSS			GND
10	NC			Not used
11	EJET	O	C	Loading motor eject control output
12	LOAD	O	C	Loading motor load control output
13	CONT	O	C	Servo driver power supply control
14	NC			Not used
15	CDMUTE	O	C	CD mute output
16	NC			Not used
17	$\overline{\text{ADENA}}$	O	C	A/D reference voltage output
18–23	NC			Not used
24	VSS			GND
25–30	NC			Not used
31	$\overline{\text{BRXEN}}$	I/O	/C	P-BUS reception enable input/output
32	$\overline{\text{BSRQ}}$	O	C	P-BUS serial pole request input
33	VDCON	O	C	VD control output
34	CD5VON	O	C	CD +5V power supply control output
35	$\overline{\text{RESET}}$	I		Reset input
36	TXARJ	I		Set up of TX output select input
37	$\overline{\text{EJSW}}$	I		Eject switch input
38	$\overline{\text{BREST}}$	I		P–BUS reset input
39	CMPAPI	I		Compression select input
40	VDD			Power supply
41	X2			Crystal oscillator connection pin
42	X1			Crystal oscillator connection pin
43	IC			GND
44	NC			Not used
45	$\overline{\text{TESTIN}}$	I		Test program mode input
46	AVSS	I		A/D GND
47	TEMP	I		Temperature detector input
48	VDSENS	I		Over voltage sense input
49	EJTD	I		Disc EJECT position detect input
50	DINC	I		Disc detect input
51	NC			Not used
52	FOK	I		FOK signal input
53	MIRR	I		MIRR detection signal input
54	LOCK	I		Spindle lock detector input
55	AVDD			Positive power supply terminal for analog circuit
56	AVREF	I		A/D converter reference voltage
57	XSO	I		LSI data input
58	XSI	O	C	LSI data output
59	$\overline{\text{XSCK}}$	O	C	LSI clock output
60	$\overline{\text{XSTB}}$	O	C	CD LSI strobe output
61	XA0	O	C	Control signal distinguishing data output
62	NC			Not used
63	BDATA	I/O	/C	P–BUS serial data input/output
64	$\overline{\text{BSCK}}$	I/O	/C	P-BUS serial clock input/output

Format	Meaning
C	C MOS

● Pin Functions(PD6169A)

Pin No.	Pin Name	I/O	Format	Function and Operation
1–3	NC			Not used
4	SLIN	I		SD level input from tuner
5	NL	I		Noise level input
6	FL	I		Filter mode input
7	DK	I		DK signal input
8	NCB	O		Filter fix output
9–11	NC			Not used
12	AVCC			Analog power supply
13	AVREF			5V power supply
14	AVSS	I		A/D GND
15	RSEL	I		Select input
16	RDCK	I		RDS demodulation clock input
17	RDDT	I		RDS demodulation data input
18	$\overline{\text{RDSE}}$	I		RDS LK signal input
19	SK	I		SK signal input
20	$\overline{\text{RRST}}$	I		Reset input
21,22	MOD0,1			GND
23	X0	I		Crystal oscillating element connection pin
24	X1	O		Crystal oscillating element connection pin
25	VSS			GND
26	$\overline{\text{DRST}}$	O	C	Reset output
27	L/S		C	Sensitivity of noise level select
28–49	NC			Not used
50	VSS			GND
51	TEST	I		Test terminal
52	RCK	I		Communication clock input
53	DO	O	C	Communication data output
54	DI	I		Communication data input
55	RRDY	O	C	Communication ready output
56	CD			GND
57	VCC			5V
58	SD	I		SD signal input
59	MDSENS	I		Modulation detect input
60–64	NC			Not used

*PD6169A



Format	Meaning
C	C MOS

7.2 DIAGNOSIS

7.2.1 DISASSEMBLY

● Removing the Case(not shown)

1. Insert and turn a flat screwdriver to remove the case.

● Removing the Grille Assy

1. Removing the four screws.
2. Removing the grille assy.

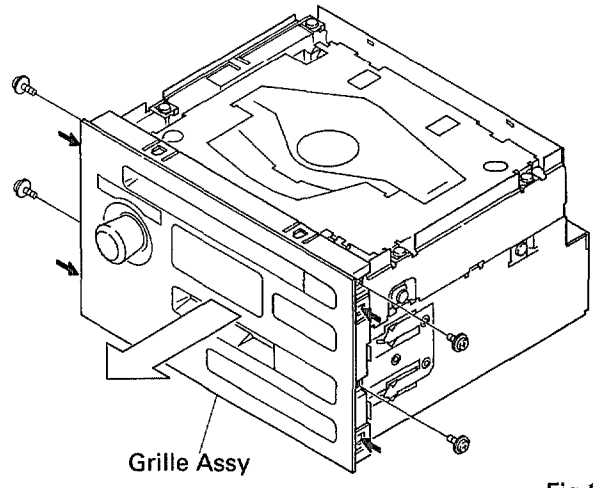


Fig.20

● Removing the CD Mechanism Module

1. Removing the four screws.
2. Disconnect the connector.
3. Removing the CD mechanism module.

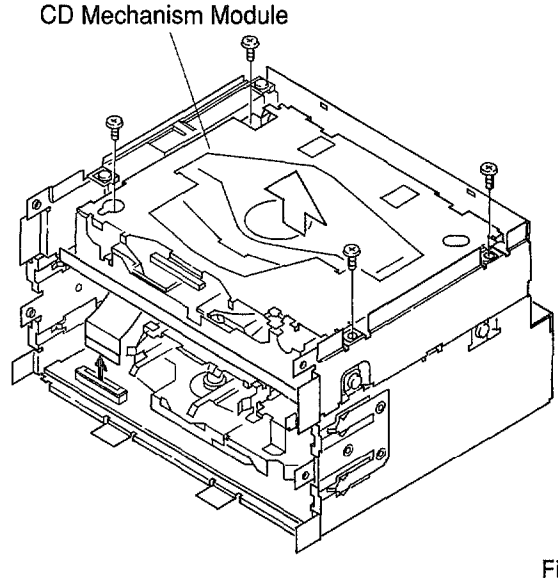


Fig.21

● Removing the Chassis Unit and Case

1. Removing the eight screws.
2. Disconnect the two connectors.
3. Removing the SUB TUNER UNIT.
4. Removing the holder.
5. Removing the chassis unit and case.

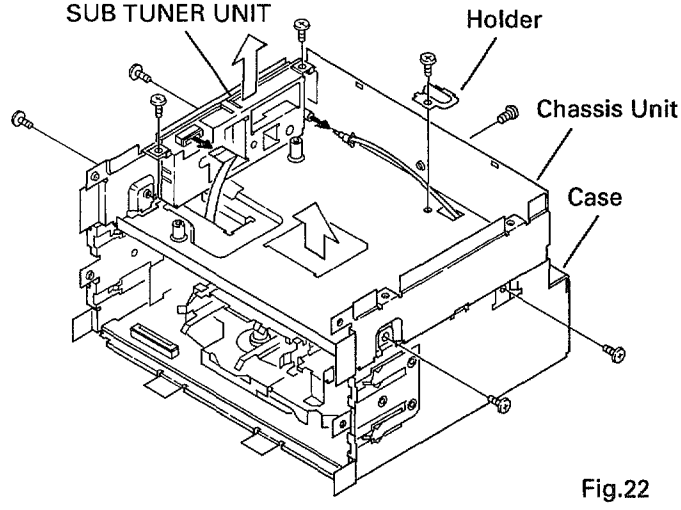


Fig.22

● Removing the Tuner Mother PCB and Connector PCB

1. Removing the seven screws.
2. Disconnect the connector and connector PCB.
3. Unbend the tabs at two locations indicated by arrows until straight.
4. Removing tuner mother PCB.

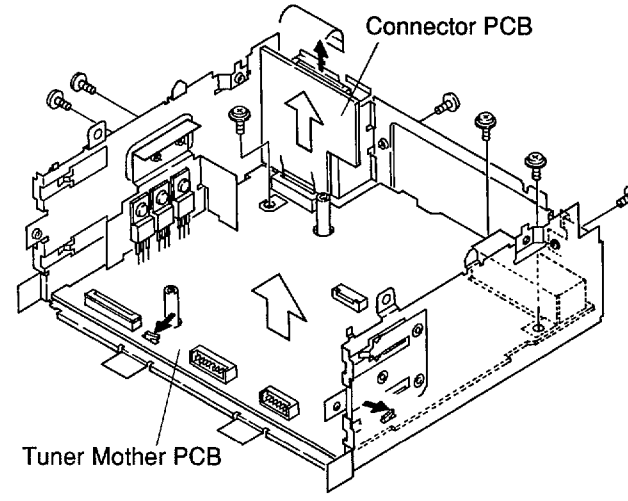
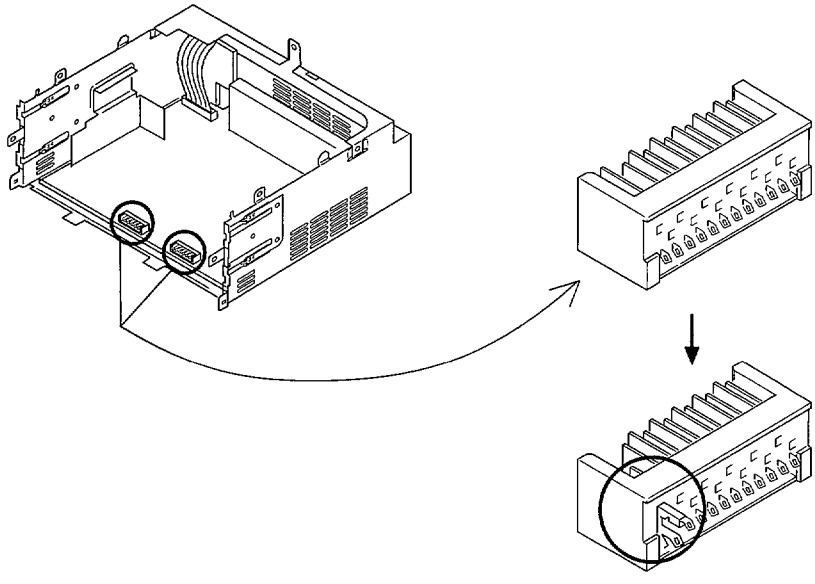


Fig.23

● Cautions on assembling

When mounting the grille assy on the chassis, be careful not to push tuner mother PCB connector pins. They might move to the rear side as shown in Fig.25 if the grille assy is mounted slantingly or forcibly. therefore, after mounting the grille assy, perform a visual check for the connector pins from the side chassis holes.



A few pins might be out of position.

Fig.24

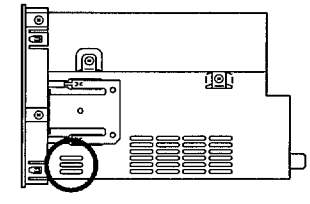


Fig.25

7.2.2 TEST MODE

● CD Test Mode

1)Precautions

· This unit uses a single power supply (+5V) for the regulator. The signal reference potential, therefore, is connected to REFO(approx. 2.5V) instead of GND.
If REFO and GND are connected to each other by mistake during adjustments, not only will it be impossible to measure the potential correctly, but the servo will malfunction and a severe shock will be applied to the pick-up. To avoid this, take special note of the following.
Do not connect the negative probe of the measuring equipment to REFO and GND together. It is especially important not to connect the channel 1 negative probe of the oscilloscope to REFO with the channel 2 negative probe connected to GND.
Since the frame of the measuring instrument is usually at the same potential as the negative probe, change the frame of the measuring instrument to floating status.
If by accident REFO comes in contact with GND, immediately switch the regulator or power OFF.

· Always make sure the regulator is OFF when connecting and disconnecting the various filters and wiring required for measurements.

· Before proceeding to further adjustments and measurements after switching regulator ON, let the player run for about one minute to allow the circuits to stabilize.

· Since the protective systems in the units software are rendered inoperative in test mode, be very careful to avoid mechanical and /or electrical shocks to the system when making adjustment.

· Test mode cancellation
Switch ACC, back-up OFF.

· Disc detection during loading and eject operations is performed by means of a photo transistor in this unit.Consequently, if the inside of the unit is exposed to a strong light source when the outer casing is removed for repairs or adjustment, the following malfunctions may occur.
*During PLAY, even if the eject button is pressed, the disc will not be ejected and the unit will remain in the PLAY mode.
*The unit will not load a disc.
When the unit malfunctions this way, either re-position the light source, move the unit or cover the photo transistor.

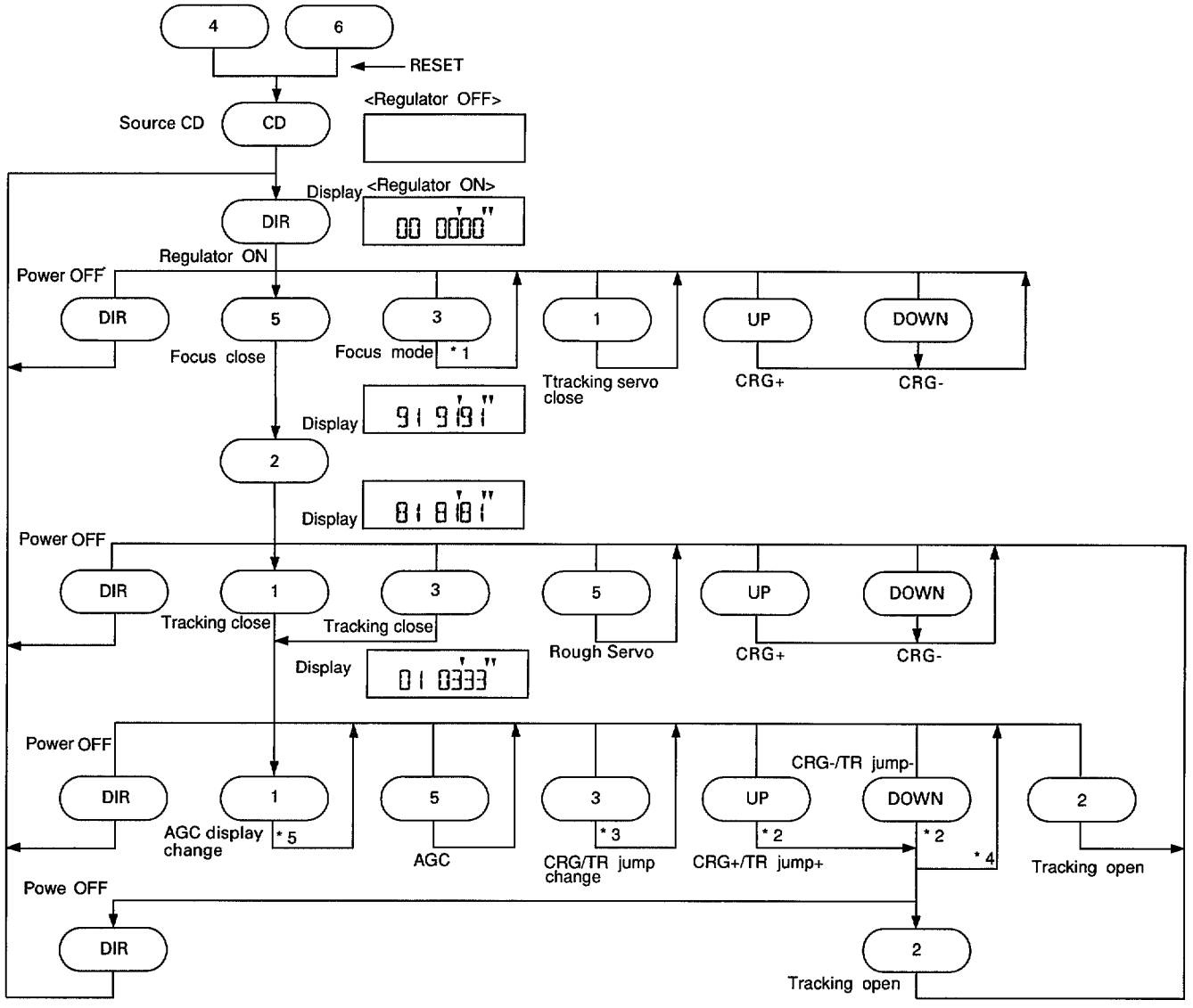
· When loading and unloading discs during adjustment procedures, always wait for the disc to be properly clamped or ejected before pressing another key. Otherwise, there is a risk of the actuator being destroyed.

· Turn power off when pressing the button TR+ or the button TR- key for focus search in the test mode. (Or else lens may stick and the actuator may be damaged.)

· SINGLE/4TRK/10TRK/32TRK will continue to operate even after the key is released.Tracking is closed the moment C-MOVE is released.

· JUMP MODE resets to SINGLE as soon as power is switched OFF.

● Flow Chart(Single CD)



*1 Normal focus close 00 → S curve check 01 → Focus EQ check 02

*2 Single TR/4TR/10TR/32TR/100TR

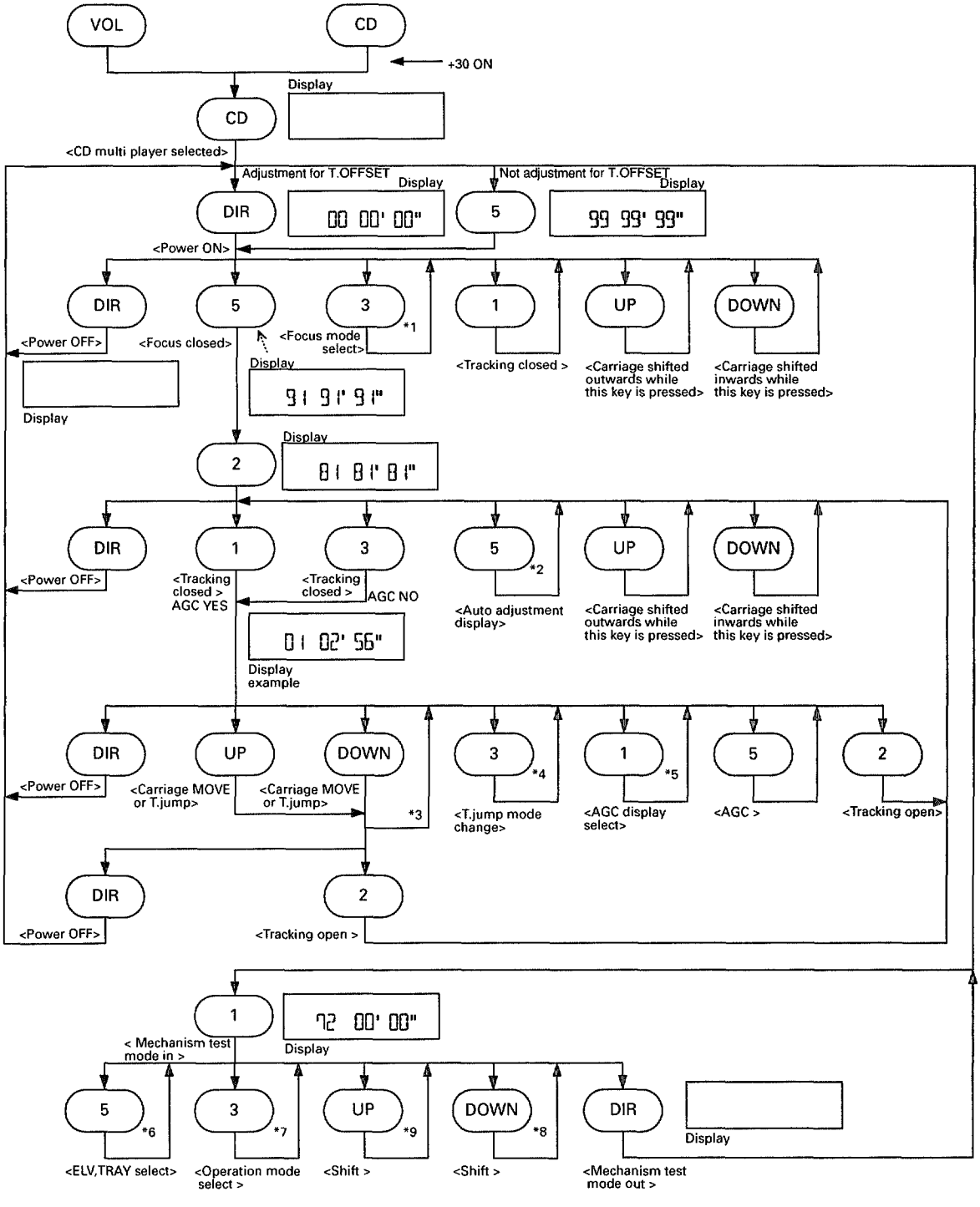
*3

→ Single TR →	4TR →	10TR →	32TR →	100TR →	CRG Move	
Display	91	92	93	94	95	96

*4 Only CRG Move, 100TRJump

*5 Min.Sec. or Track No. → F. AGC Gain → T.AGC Gain

● Flow Chart(Multi CD)



*1 Normal focus close → S curve check → Focus EQ check
00 00' 00" Display 01 01' 01" 02 02' 02"

*2 Normal display → Focus cancel → Tracking offset → Tracking balance (Close spindle-rough)

*3 100 TRK jump & carriage MOVE continue only while the keys are pressed

*4 SINGLE → 4TRK → 10TRK → 32TRK → 100TRK → C.MOVE
81 Display 82 83 84 85 86

*5 Normal display → Focus gain → Tracking gain → Focus bias

*6 ELV motor select → TRAY motor select
72 00' 0X" Display 72 10' 0X"

*7 ELV select: 8ms pulse drive → 24ms pulse drive → DC drive
72 00' 00" Display 72 00' 01" 72 00' 02"

TRAY select: 48ms pulse drive → 200ms pulse drive → DC drive
72 10' 00" Display 72 10' 01" 72 10' 02"

*8 ELV select : ELV dowm (Disc 1 to 6)
TRAY select : TRAY out

*9 ELV select : ELV up (Disc 6 to 1)
TRAY select : TRAY in

● Error Number Indication

If the CD should fail to operate or if an error has taken place during operation the player will enter into the error mode, and the cause of the error will be numerically indicated.

This is aimed at assisting in analysis or repair.

(1) Examples of Display Err-XX

(2) Error Codes

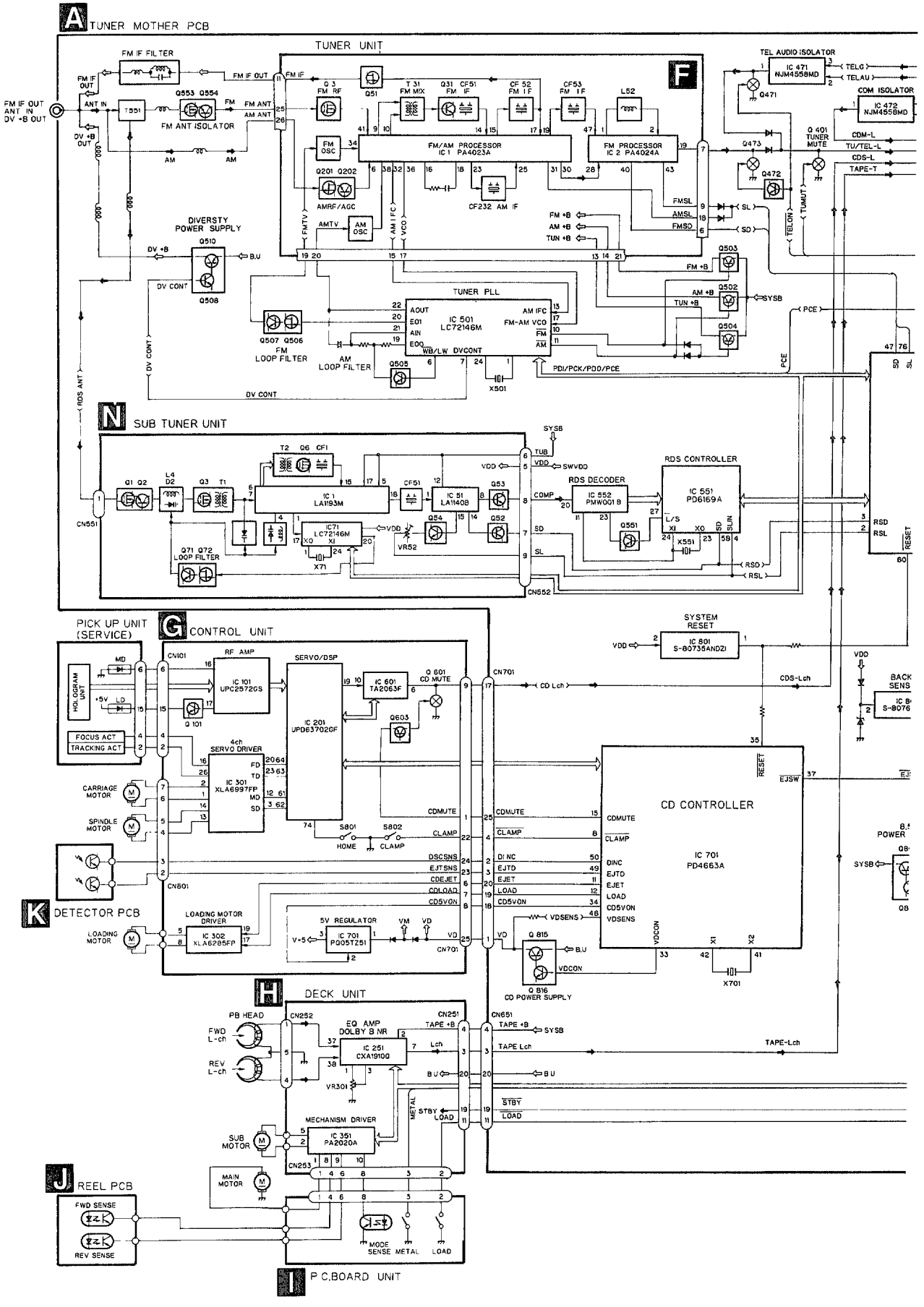
Error Code	Classification	Description	Cause/Detail
10	ELECTRIC	Carriage home failure	Carriage doesn't move to or from the innermost position →Home switch failed and/or carriage immobile
11	ELECTRIC	Focus failure	Focus failed →Defects, disc upside-down, severe vibration
12	ELECTRIC	SETUP failure Subcode failure	Spindle failed to lock or subcode unreadable →Spindle defective, defect, severe vibration
14	ELECTRIC	Mirror failure	Unrecorded CD-R The disc is upside-down, defects, vibration
17	ELECTRIC	Set up failure	AGC protect failed →Defects, disc upside-down, severe vibration
19	ELECTRIC	Set up failure	Tracking error waveform is too unbalanced (>50%) or level is too small →The P.U.unit or tracking error circuitry is N.G.
30	ELECTRIC	Search time out	Failed to reach target address →Carriage/tracking defective and/or defects
A0	SYSTEM	Power failure	Power overvoltage or short circuit detected →Switching transistor defective and/or power abnormal
A1	SYSTEM	Mechanism power failure	Mechanism elevation reference voltage is out of prescription →EREF adjustment VR and/or power abnormal
50	MECHANISM	An error upon ejection	MAG switch release time has time out Elevation time out when eject
60	MECHANISM	An error while putting in and out the tray	Tray in / out time has time out Tray is caught when put in
70	MECHANISM	An error upon elevation	Elevation time has time out
80	MECHANISM	An error with an empty magazine inserted	No disc is available

* Setup means a series of operations after focusing up to sound output.

A1,50,60,70,80 : error code of multi CD

7.3 EXPLANATION

7.3.1 BLOCK DIAGRAM



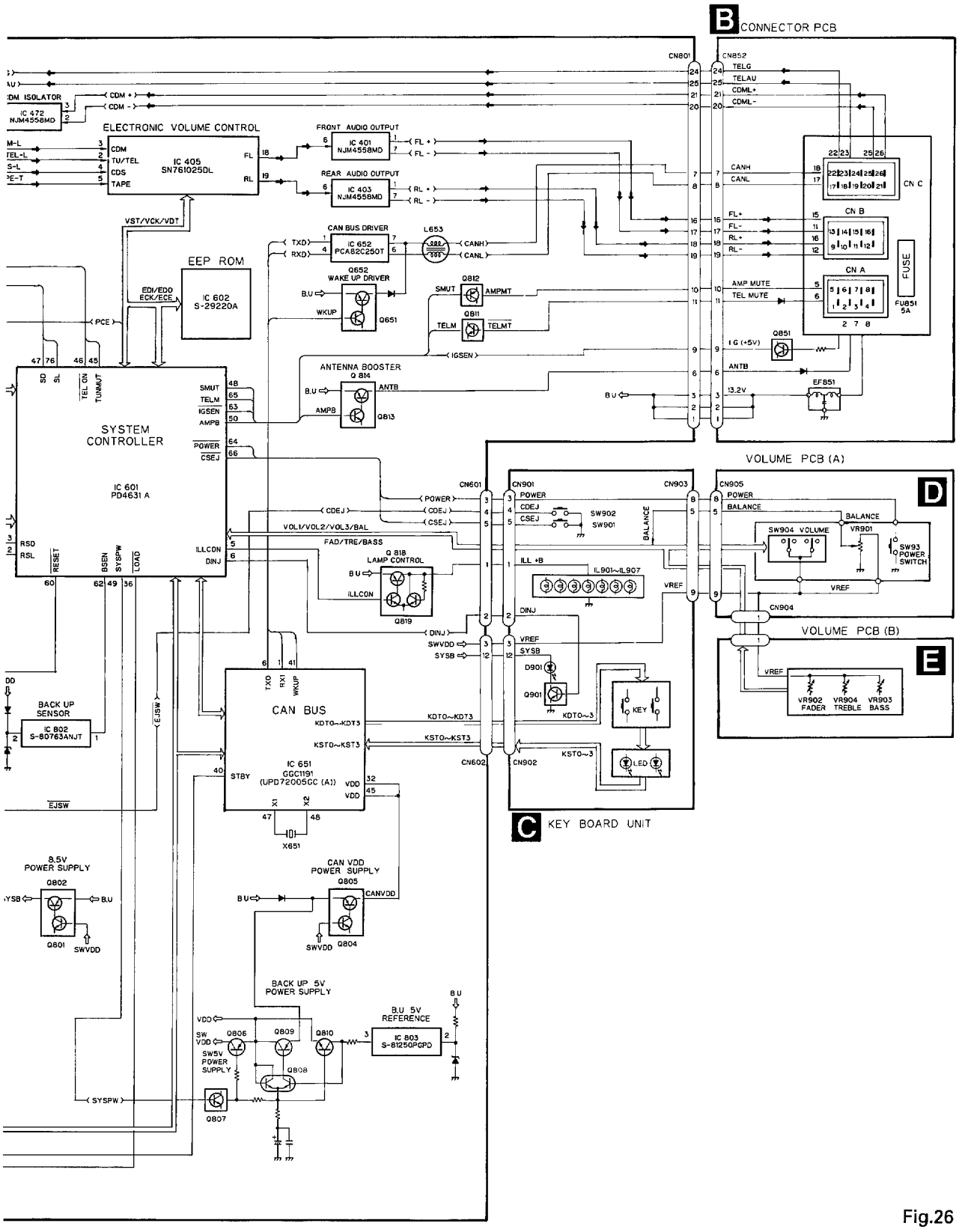

B CONNECTOR PCB
CN801
CN852
TELG
TELAU
CDML+
CDML-
CDM ISOLATOR
IC 472
NJM4558MD
CDM +
CDM -
ELECTRONIC VOLUME CONTROL
IC 405
SN7610250DL
CDM
TU/TEL
CDS
TAPE
FL
RL
FRONT AUDIO OUTPUT
IC 401
NJM4558MD
FL +
FL -
REAR AUDIO OUTPUT
IC 403
NJM4558MD
RL +
RL -
CANH
CANL
CN C
CN B
CN A
FL+
FL-
RL+
RL-
AMP MUTE
TEL MUTE
FUSE
FU851
5A
VST/VCK/VDT
EEP ROM
IC 602
S-29220A
EDI/EDO
ECK/ECE
PCE
CAN BUS DRIVER
IC 652
PCA82C250T
TXD
RXD
L653
Q652
WAKE UP DRIVER
WKUP
Q651
Q812
SMUT
AMPMT
Q811
TELM
TELMT
IGSEN
Q851
IG (+5V)
ANTB
13.2V
EF851
ANTENNA BOOSTER
Q 814
AMPB
Q813
SYSTEM
CONTROLLER
IC 601
PD4631 A
SD
SL
TEL ON
TUNMUT
SMUT
TELM
IGSEN
AMPB
POWER
CSEJ
RSD
RSL
RESET
BSEN
SYSPW
LOAD
ILLCON
DINJ
VOLUME PCB (A)
CN601
CN901
CN903
CN905
POWER
CDEJ
CSEJ
SW902
SW901
BALANCE
VOL1/VOL2/VOL3/BAL
FAD/TRE/BASS
Q 818
LAMP CONTROL
Q819
ILL +B
IL901~IL907
VREF
SW904 VOLUME
VR901
SW93
POWER
SWITCH
CN904
VOLUME PCB (B)
VR902
FADER
VR904
TREBLE
VR903
BASS
D
E
C KEY BOARD UNIT
CN602
CN902
SWVDD
SYSB
D901
Q901
KEY
LED
KDT0~3
KST0~3
KDT0~KDT3
KST0~KST3
CAN BUS
IC 651
GGC1191
(UPD72005GC (A))
STBY
VDD
X1
X2
X651
EJSW
BACK UP
SENSOR
IC 802
S-80763ANJT
8.5V
POWER SUPPLY
Q802
Q801
SWVDD
CAN VDD
POWER SUPPLY
Q805
CANVDD
Q804
BACK UP 5V
POWER SUPPLY
B.U 5V
REFERENCE
IC 803
S-81250PGPD
Q806
Q809
Q810
Q808
Q807
SW5V
POWER
SUPPLY
SYSPW
B.U

Fig.26

7.3.2 SYSTEM

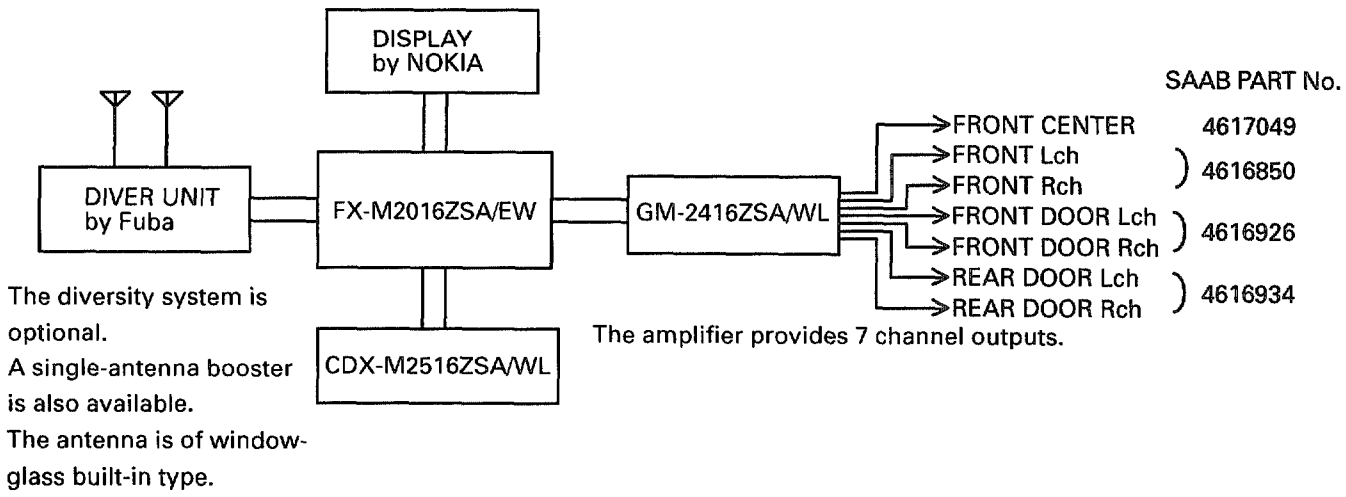


Fig.27

7.3.3 JIG

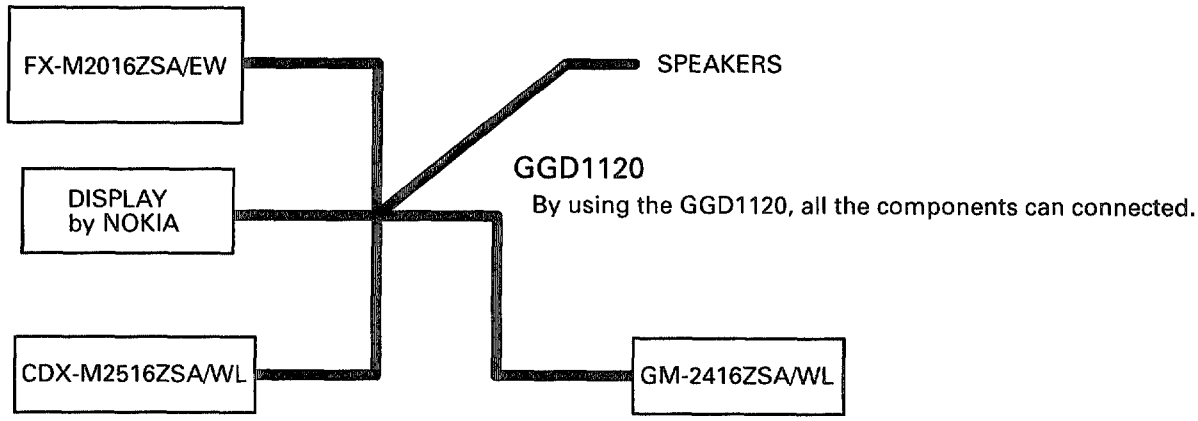


Fig.28

8. OPERATIONS AND SPECIFICATIONS

8.1 OPERATIONS

● **TAPE**

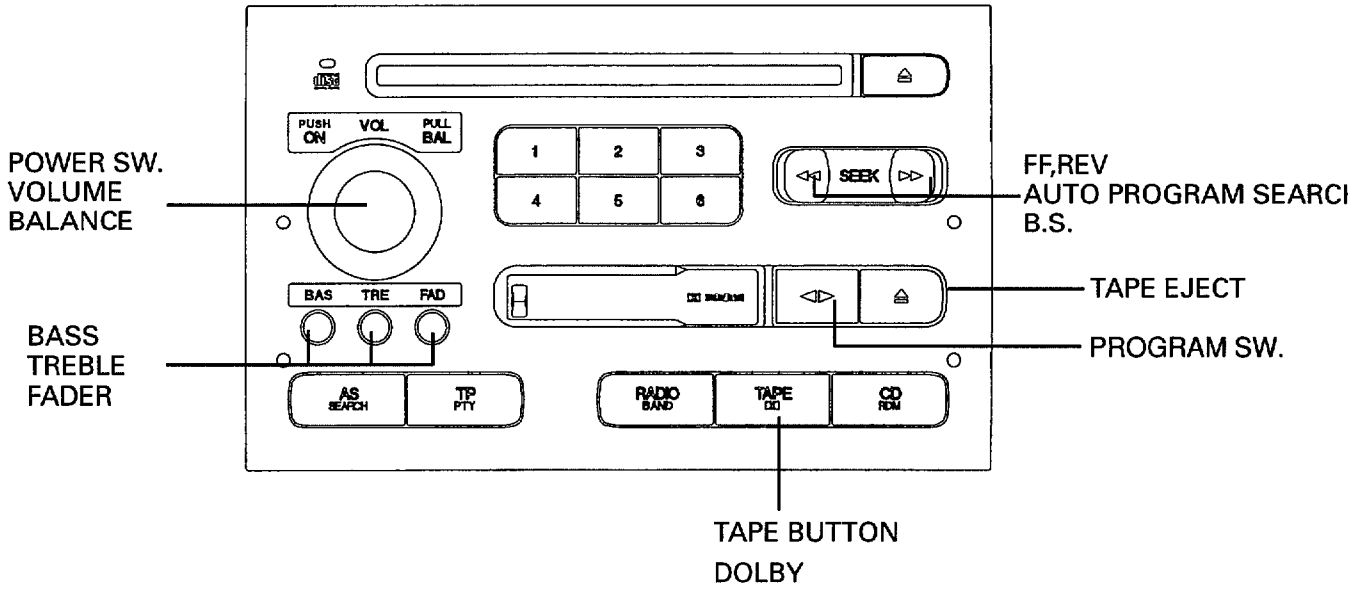


Fig.29

● **RADIO**

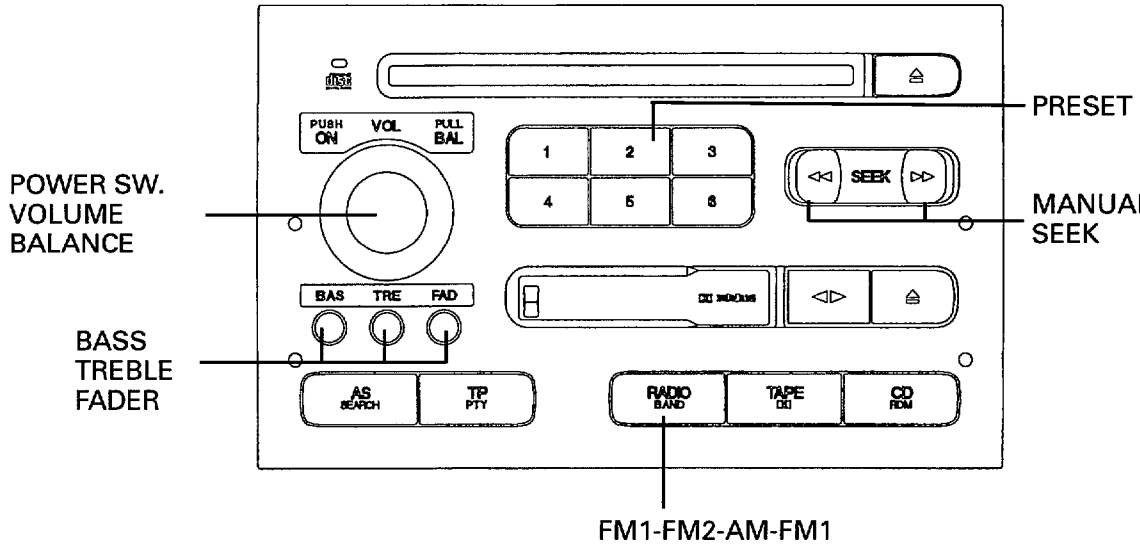


Fig.30

● CD

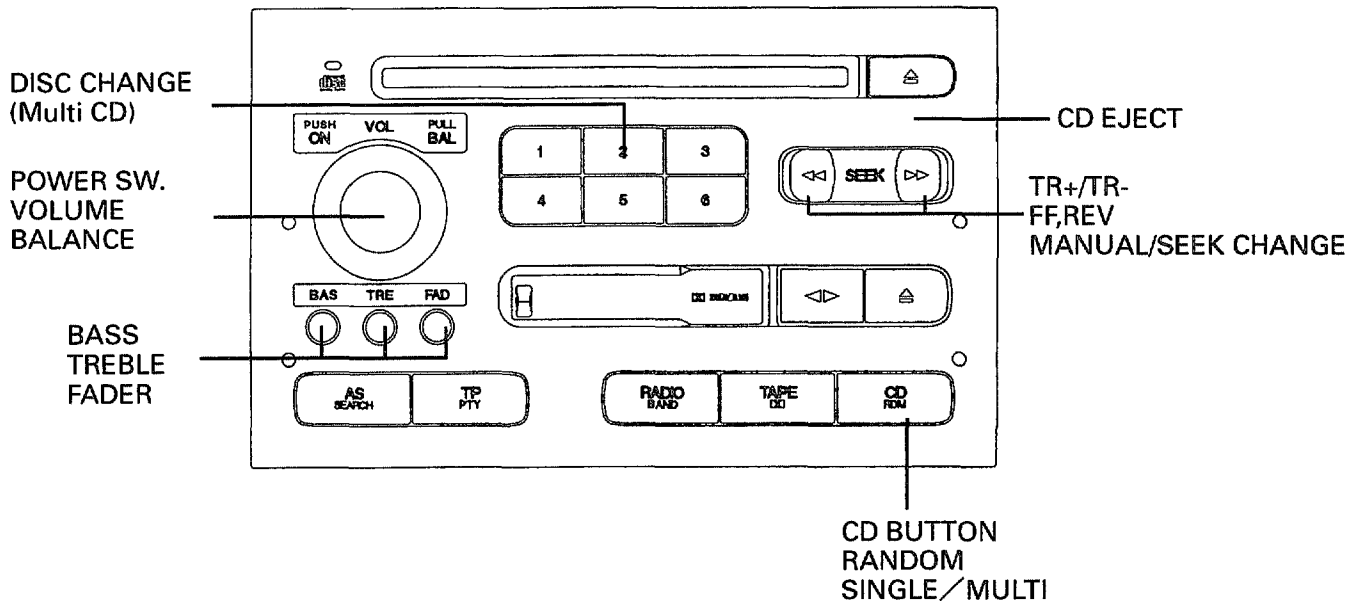
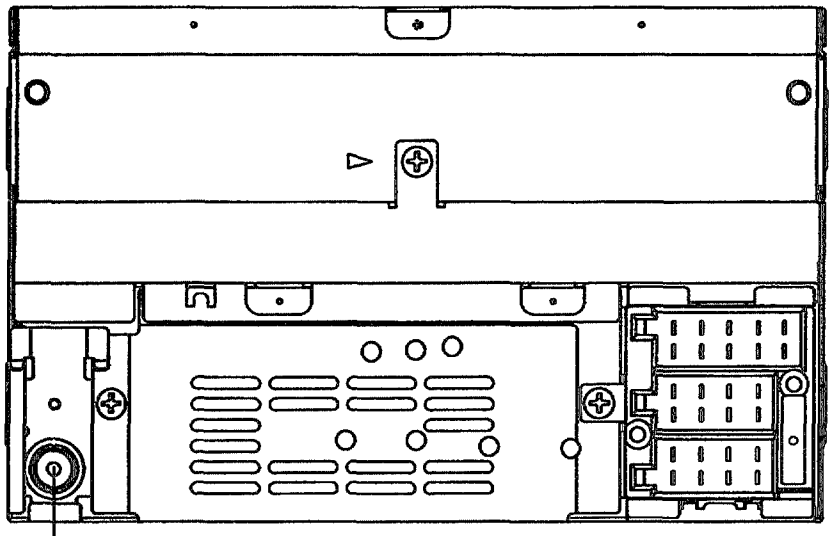
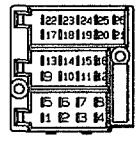


Fig.31

8.2 CONNECTOR



Ⓐ ISO CONNECTOR



CONNECTOR PIN LOCATION

Power supply, control input (level 3)

	GME	
pin	1	NC
pin	2	+12V ignition voltage (+B)
pin	3	NC
pin	4	chassis ground
pin	5	Amplifier mute
pin	6	Telefon-mute control input
pin	7	+12V antenna remote
pin	8	+12V battery voltage (+30)

Speaker output (level 2)

	GME	
pin	9	RR ground
pin	10	FR ground
pin	11	FL ground
pin	12	RL ground
pin	13	RR signal
pin	14	FR signal
pin	15	FL signal
pin	16	RL signal

Databus CD-input (level 1)

	GME	
pin	17	EBUS data-line wire 1 (low)
pin	18	EBUS data-line wire 2 (high)
pin	19	NC
pin	20	CD audio ground right
pin	21	CD audio input signal right
pin	22	Telefon ground
pin	23	Telefon audio input signal (mono)
pin	24	CD audio ground
pin	25	CD audio ground left
pin	26	CD audio input signal left

Fig.32

8.3 SPECIFICATIONS

Power source .....13.5V±0.1V
Grounding system.....Negative type
Dimensions .....195.6(W)x118.2(H)x183.5(D)mm
Weight 2340g

AUDIO
Tone control
Tone charact bass .....±9dB
Tone charact treble .....±9dB
Fader charact.....-30dB or less
Balance charact.....-30dB or less

CD
System .....Compact disc audio system
Usable discs .....Compact disc
Signal .....Sampling frequency:44.1kHz
Number of quantization bits:16;linear
S/N .....80dB or more
Distortion .....0.03% or less
Separation .....70dB or more

TAPE
Tape .....Compact cassette tape(C30-C90)
Tape speed .....4.76 cm/sec.(+0.14 cm/sec.,-0.05 cm/sec.)
Crosstalk .....40dB or less
Separation .....35dB or more
S/N .....45dB or more
Distortion .....2% or less

FM TUNER
Frequency .....87.5-108.0 MHz
Usable sensitivity 11dBf
S/N .....50dB or more
Distortion .....1.0% or less
Separation .....25dB or more

MW/LW TUNER
Frequency .....153-281 kHz(LW)
.....531-1602kHz
Selectivity .....45dB or more(±9kHz)
S/N .....40dB or more
Distortion .....1.0% or less

PIONEER®
The Art of Entertainment

Service Manual

ORDER NO.
CRT1829

CD MECHANISM MODULE

CX-597

- **This service manual describes the operation of the CD mechanism incorporated in models listed in the table below.**
- **When performing repairs use this manual together with the specific manual for model under repair.**

Model	Service Manual	CD Mechanism Module	CD Mechanism Unit
DEH-P825R/EW, DEH-P825/UC DEH-P823/ES, DEX-P99/UC	CRT1805	CXK5011	CXA8880
DEH-P725R/EW, DEH-P725R-W/EW DEH-P725/UC, DEH-P725-W/UC DEH-P723/ES, DEH-P625/UC DEX-P88/UC, DEX-P77R/EW	CRT1812	CXK5001	CXA8870
DEH-625R/EW, DEH-624R/EW DEH-525R/EW, DEH-524R/EW DEH-424R/GR, DEH-424/EW DEH-425/IT	CRT1808	CXK5001	CXA8870
DEH-59/UC, DEH-52/UC DEH-525/UC, DEH-49/UC DEH-42/UC, DEH-425/UC DEH-225/UC, DEH-523/ES DEH-323/ES, DEH-223/ES	CRT1809	CXK5001	CXA8870

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1. THE SUMMARY OF CIRCUITS

1.1 PRE-AMP SECTION (UPC2572GS: IC101)

This section processes the pickup output signals to create the signals for the servo, demodulator & control.

The pickup output signals are I-V converted by the pre-amp with built in photo-detector in the pickup, and added by the RF amp (IC101) to obtain the RF, FE, TE, TE zero cross, and other signals.

The main component is the UPC2572GS and each section is explained below. Because this system has a single power supply (+5V), the reference voltage for this IC, the PU and the servo circuit is the voltage REFO (+2.5V). The REFO signal is obtained by buffering REFOUT from the servo LSI (IC201: UPD63702GF) and is available from Pin 19 of IC101. All measurements should be done using this REFO as reference.

Note: During measurement, do not short REFO and GND.

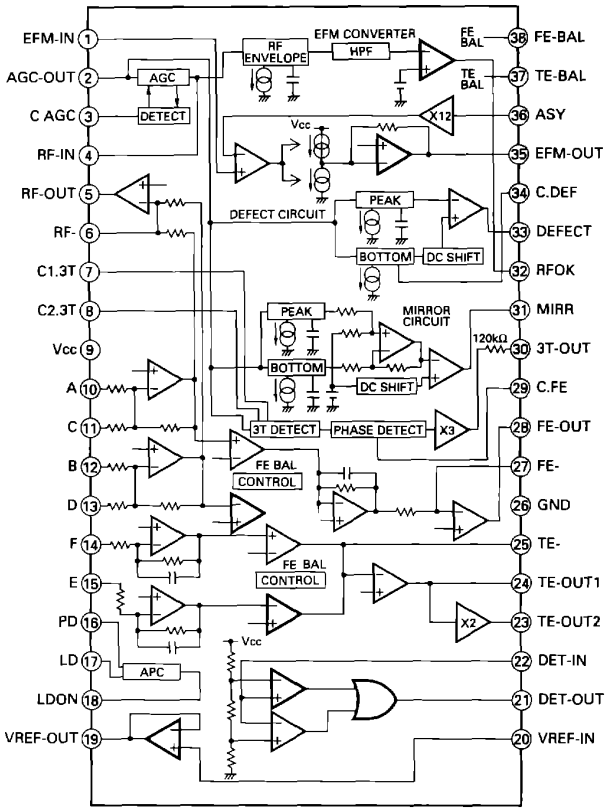


Fig.1 : UPC2572GS BLOCK DIAGRAM

1) APC Circuit (Automatic Power Control)

When the laser diode is driven with constant current, the optical output has large negative temperature characteristics. So the current must be controlled to hold the output constant with the monitor diode. The circuit that carries out this function is the APC circuit. The LD current is obtained by measuring the voltage between LD1 and ground and the value of this current is about 35mA.

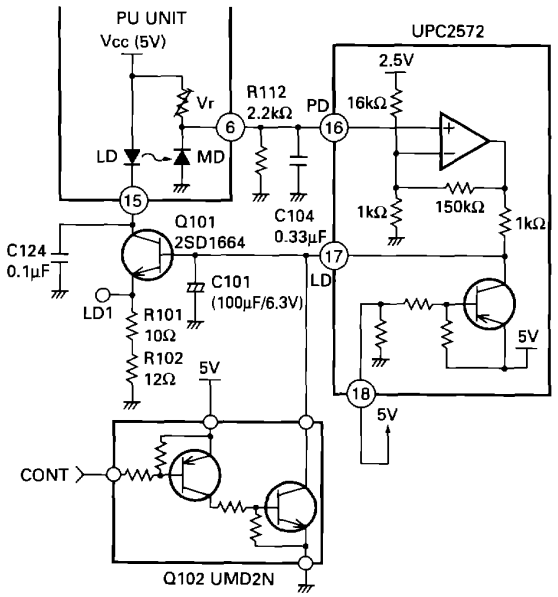


Fig.2 : APC CIRCUIT

2) RF Amp, RF AGC Amp

The photo-detector outputs (A+C) and (B+D) are added, amplified, and equalized in IC101 and output to the RFI pin. (The eye pattern can be checked at this pin.)

The RFI voltage low-frequency component is:

RFI = (A+B+C+D) × 3.22

R111 is the offset resistor for holding the RFI signal in the pre-amp's output range. The RFI signal is AC coupled and input to Pin 4 (RFIN pin).

This IC contains an RF AGC circuit, which holds the RFO output at Pin 2 at a fixed level (1.2 ± 0.2Vp-p). This RFO signal is used in the EFM, DFCT, and MIRR circuits.

3) EFM Circuit

This circuit, "squares" up the analog RF signal into a digital EFM signal. In order to ensure minimum errors it is necessary to use a feedback circuit to match the DC level of the threshold to the center of the RF waveform.

This circuit uses the fact that the EFM signal should have no DC component. By feeding back the EFM signal's DC level the threshold level changes until the DC level is zero and the threshold, by definition, is at the exact center of the RFO waveform. The filtering in the feedback has been adjusted to ensure minimum error. The EFM signal is output from Pin 35. The signal is a 2.5Vp-p amplitude signal centering on REFO.

4) DFCT (Defect) Circuit

The DFCT circuit detects defects on the disc surface, and outputs a "H" signal from Pin 33.

If there is dirt on the disc, drop outs may appear. The DFCT signal output is input to the servo LSI HOLD pin and the focus and tracking servo drives are held while the DFCT output is "H" in order to improve playability.

5) RFOK Circuit

This circuit produces the signal indicating the focus close state during play and the timing for closing the focus servo. This signal is output from Pin 32. This RFOK signal output is input to the servo LSI RFOK pin and the focus close command is issued by the servo LSI. This signal is high during play when the focus is closed.

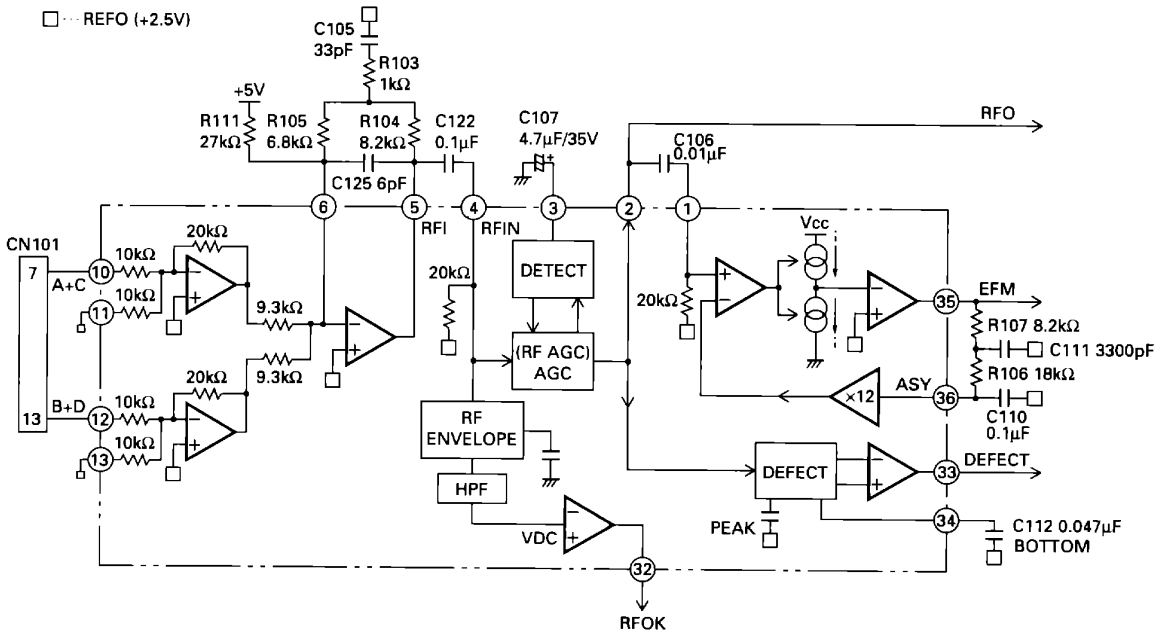


Fig.3 : RF AMP, RF AGC, EFM, DFCT, RFOK CIRCUIT

6) Focus Error Amp

The photo-detector outputs (A+C) and (B+D) are passed through a differential amp, and an error amp and (A+C-B-D) is output from Pin 28 as the FE signal.
The FEY voltage low-frequency component is:

$$FEY = (A+C-B-D) \times \frac{20k\Omega}{10k\Omega} \times \frac{90k\Omega}{68.8k\Omega} \times \frac{R108}{17.2k\Omega}$$

: (PU FE level × 5.02)

An S curve of about 1.6Vp-p is obtained with REFO as the reference. The final-stage amp cutoff frequency is 12.4kHz.

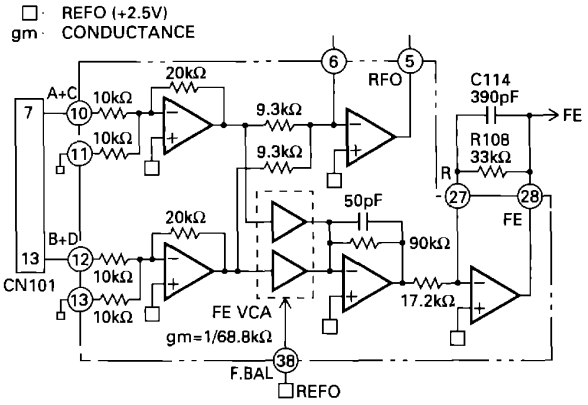


Fig.4 : FOCUS ERROR AMPLIFIER

7) Tracking Error Amp

The photo-detector E and F outputs are passed through a differential amp and an error amp and (E-F) is output from Pin 24 as the TE signal.
The TEY voltage low-frequency component is:

$$TEY = (E-F) \times \frac{63k\Omega}{(31k\Omega+16k\Omega)} \times \frac{R109}{17k\Omega}$$

: (PU TE output level × 5.36)

The TE waveform of about 1.5Vp-p with REFO as the reference is obtained as the TE output (Pin 24). The final-stage amp cutoff frequency is 19.5kHz.

8) Tracking Zero Crossing Amp

The tracking zero crossing signal (below, TEC signal) is the TE waveform (Pin 24 voltage) amplified four times and is used to find the zero crossing points of the tracking error with the UPD63702GF servo LSI. This zero crossing point is found for the following two reasons.

(1) To count tracks for carriage moves and track jumps
(2) To detect the direction in which the lens is moving for tracking closing (This is used in the tracking brake circuit, described Page 9 b).)

The TEC signal frequency range is 500Hz - 19.5kHz.

TEC voltage = TE level × 4

In other words, the TEC signal level is calculated at 6Vp-p. This level exceeds the op-amp's output range and the signal is clipped, but this can be ignored because this signal is used by the servo LSI only at the zero crossing point.

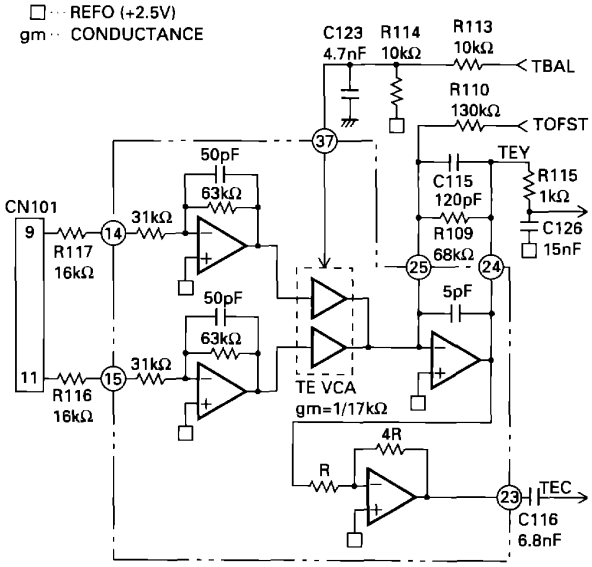


Fig.5 : TRACKING ERROR AMPLIFIER & TRACKING ZERO CROSSING AMPLIFIER

9) MIRR (Mirror) Circuit

The MIRR signal shows the on track and off track data and is output from Pin 31.

When the laser beam is

On track: MIRR = "L"

Off track: MIRR = "H"

This signal is used in the brake circuit, described Page 9 b).

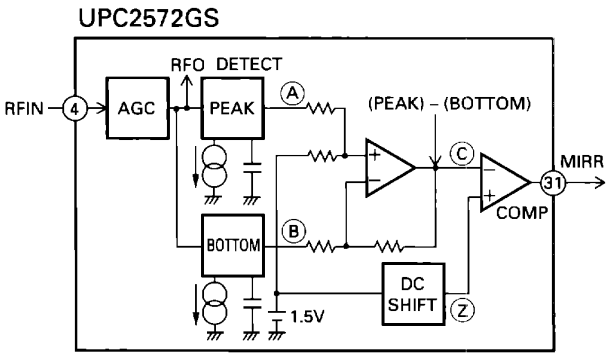


Fig.6 : MIRR CIRCUIT

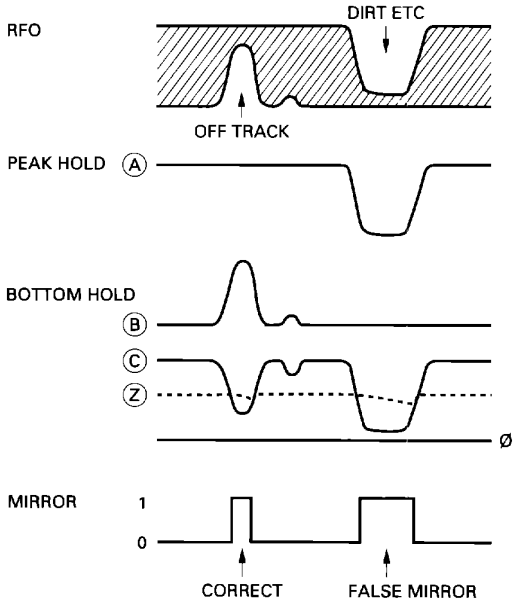


Fig.7 : MIRR CIRCUIT & SIGNAL DIAGRAM

10) 3TOUT Circuit

This circuit detects variations of the RF signal when an external interference is input into the focus servo loop and outputs the phase difference between the FE signal and the RF level variation signal from Pin 30. The signal has been passed through a low-pass filter (fc = 40Hz). This signal is used for the FE bias automatic adjustment, described Page 12 4).

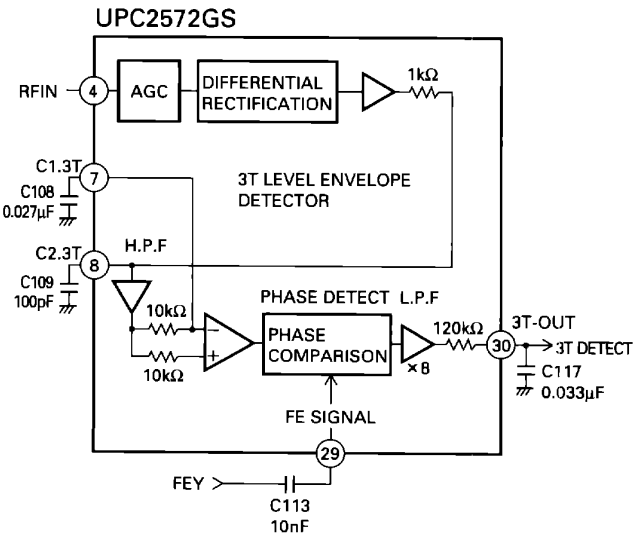


Fig.8 : 3T OUT CIRCUIT

1.2 SERVO SECTION (UPD63702GF: IC201)

This section can be divided into two parts.
One is the servo processing section, which handles such servo controls as error signal equalizing, in focus, track jump, and carriage move. The other is the signal processing section, which handles data decoding, error correction, and interpolation processing.
This IC converts the FE and TE signals from analog to digital and outputs the focus, tracking, and carriage drive signals via the servo block. Also, the EFM signal from the pre-amp is decoded in the signal processing section and finally output as audio signals after D/A conversion. (This IC has a built in audio digital-analog converter.) The decoding process also creates the spindle servo error signals, which is fed to the spindle servo block to create the spindle drive signal.
The focus, tracking, carriage, and spindle drive signals are then amplified by IC301, XLA6997FP and fed to their respective actuators and motors.

1) Focus Servo System

The main focus servo equalizer is in the UPD63702GF. Figure 9 is the focus servo block diagram.
In the focus servo system, the lens must be brought within the in-focus range for focus closing. Therefore, the lens is raised and lowered according to the triangular focus search voltage to find the focus point. During this time the spindle motor is kicked and kept rotating at a set speed.
The servo LSI monitors the FE signal and the RFOK signal and automatically carries out the focus close operation at the appropriate point.
Focus closing is carried out when the following four conditions are all met.
(1) The lens is moving from far to near toward the disc surface.
(2) RFOK = H
(3) The FZD signal (within the IC) is latched at high.
(4) FE = 0 (REFO reference)

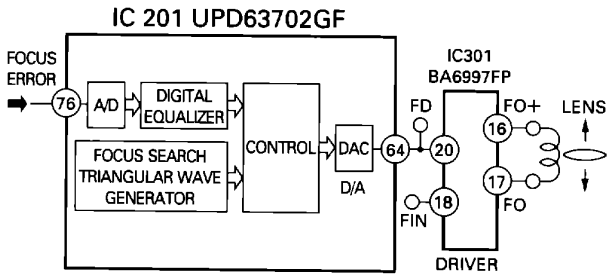


Fig.9 : FOCUS SERVO BLOCK DIAGRAM

When the above conditions are all met and the focus is closed, the XSO signal is shifted from high to low, then 40ms later, the microcomputer begins to monitor the RFOK signal that is passed through the low pass filter.
When the RFOK signal is judged to be low, the microcomputer carries out various actions such as protection.
Figure 10 shows the series of operations for focus closing (for the case where focus cannot be closed.) Also, in focus-mode-selection during test mode when the display is 01, if the focus close button is pressed, the S curve, search voltage, and actual lens movements can be checked.

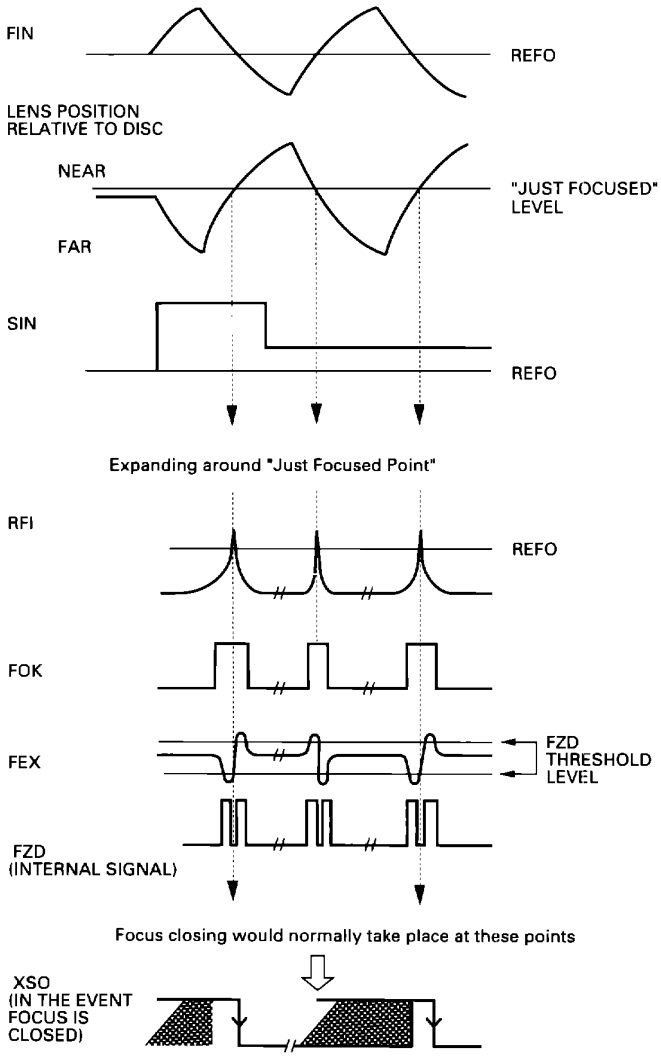


Fig.10 : FOCUS CLOSING SEQUENCE

2) Tracking Servo System

The main tracking servo equalizer is in the UPD63702GF. Figure 11 is the tracking servo block diagram.

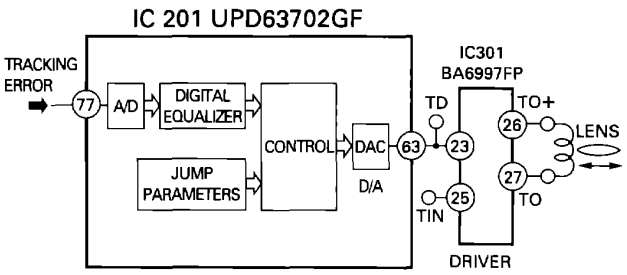


Fig.11 : TRACKING SERVO BLOCK DIAGRAM

a) Track Jump

When the LSI receives the track jump command from the microcomputer, the track jump is carried out automatically by the auto sequence function within the LSI. This system has six types of track jumps used for searches: 1, 4, 10, 32, 32 × 2, and 32 × 3. In test mode, in addition to these jumps, CRG moves can be executed and checked by mode selection. For track jumps, the microcomputer sets half of the total number of jumps (2 tracks for a 4 track jump) and counts the set number of tracks using the TEC signals. From the point when it has counted the set number of tracks, it outputs the brake pulse for a fixed period of time (set by the microcomputer) to stop the lens. In this way, it can close the tracking and continue normal play.

To improve the servo loop re-closing performance just after track jump, the brake circuit comes on for 60ms after the end of the brake pulse and the tracking servo gain is increased.

Fast forward and reverse operations in normal mode are realized by executing consecutive single track jumps. The speed is about 10 times as high as in normal play.

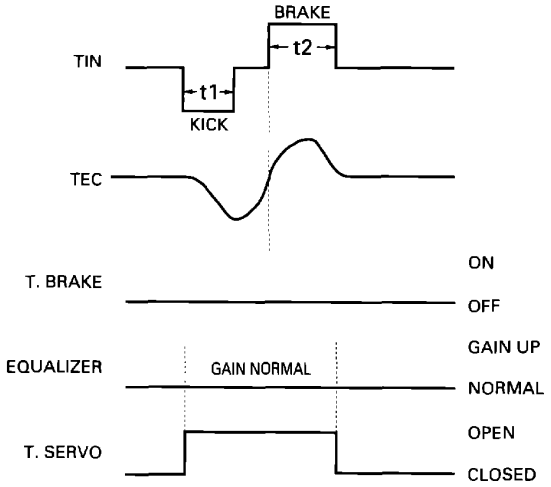


Fig.12 : SINGLE TRACK JUMP

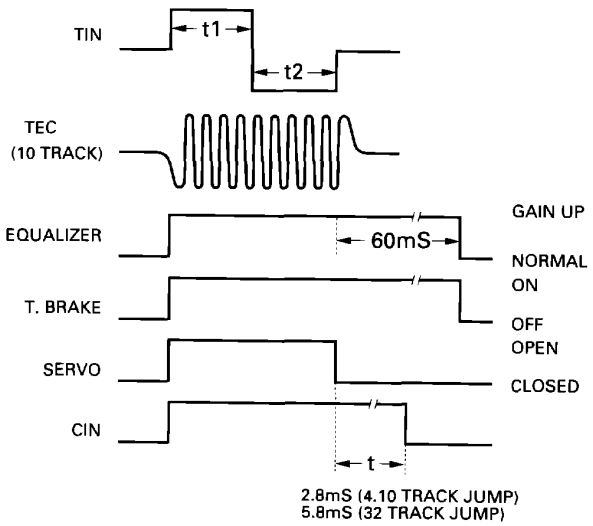
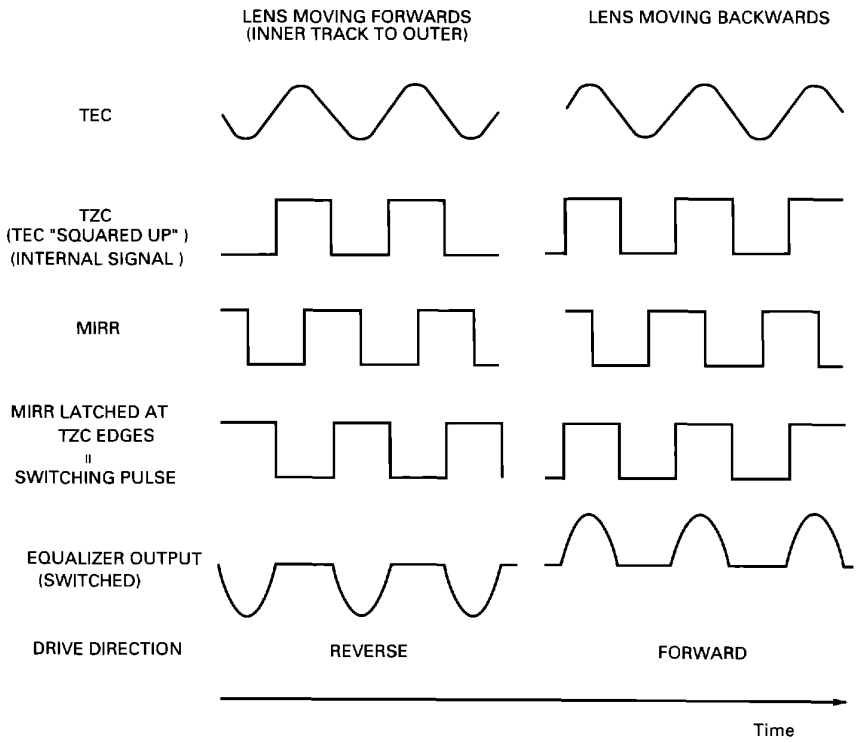


Fig.13 : MULTI-TRACK JUMP

b) Brake Circuit

This relies on determining which direction the lens is moving and only outputting the portion of the drive waveform which acts to oppose this motion. Direction of motion is deduced from TEC and the MIRR signal and knowledge of their phase relation.



Note: Equalizer output assumed to hava same phase as TEC.

Fig.14 : TRACKING BRAKE CIRCUIT

3) Carriage Servo System

The carriage servo supplies the tracking equalizer's low-frequency component (lens position information) output to the carriage equalizer and after applying a fixed amount of gain, outputs the drive signal from the servo LSI. This signal is applied to the carriage motor through the driver IC.

When the lens offset reaches a certain level during play, the entire PU must be moved in the forward direction. Therefore, the equalizer gain is adjusted to output a voltage higher than the carriage motor starting voltage. In actual operations, a certain threshold level is set for the equalizer output within the servo LSI and the drive voltage is output from the servo LSI only when the equalizer output level exceeds that threshold level. This reduces power consumption. Also, due to disc eccentricity and other factors, the equalizer output voltage may cross the threshold level a number of times before the entire PU starts to move. In this case, the drive voltage waveform, (which is applied) from the LSI, becomes pulsative.

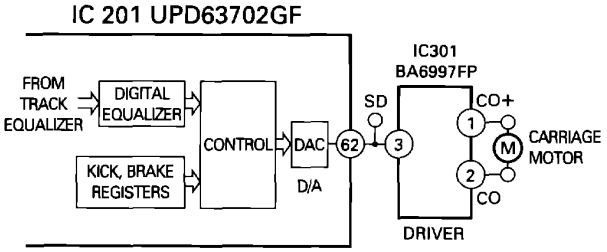


Fig.15 : CARRIAGE SERVO CIRCUIT

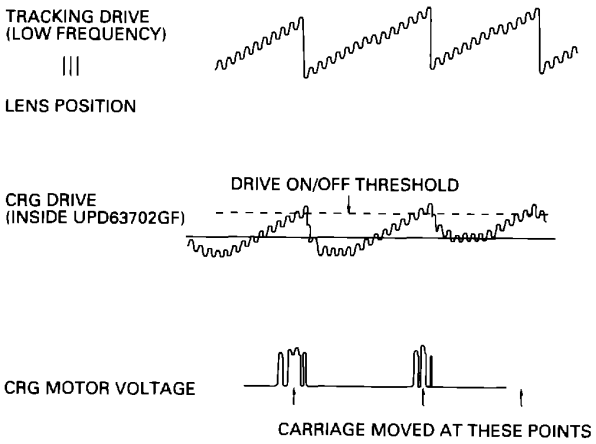


Fig.16 : CARRIAGE WAVEFORM

4) Spindle Servo System

The spindle servo has the following modes.

(1) Kick: The mode used for disc rotation acceleration during setup

(2) Offset:

a) Used during setup from the end of kick until the AGC end

b) Used during play when the focus is unlocked until it is recovered

Both of these are for holding the disc rotation rate near the normal rotation rate.

(3) Adaptive servo: CLV servo mode for normal operation

In the EFM demodulation block, the frame sync signal and internal frame counter output signal are sampled each WFCK/16 and a signal is produced indicating whether or not they match. Only after this signal is in non-match mode eight consecutive times, is the system treated as out of sync, at other times it is treated as in sync. In this adaptive servo mode, a servo mode for pulling the system into sync is automatically selected when the system is out of sync and the regular servo is automatically selected when the system is in sync.

(4) Brake: The mode for stopping the spindle motor rotation

The brake voltage is output by the microcomputer from the servo LSI. At this time, the EFM wave form is monitored within the LSI and if the longest EFM pattern exceeds a certain interval (when the rotation is slow enough), a flag is registered within the LSI and the microcomputer switches the brake voltage off. If the flag is not registered within a certain period of time, the microcomputer switches from brake mode to stop mode which lasts for a fixed period of time. In this case, ejection of the disc can only occur after this period of time.

(5) Stop: The mode used during power on and ejection

At this time, the voltage across the spindle motor is 0V.

(6) Rough servo: The mode used for carriage feed (carriage move during a long search)

The linear speed is calculated from the EFM wave form and a high level or low level is input to the spindle equalizer. In test mode, this mode is also used for the grating check.

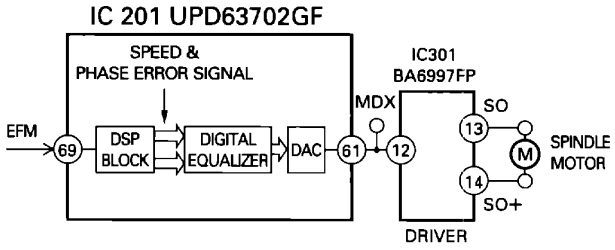


Fig.17 : SPINDLE SERVO BLOCK DIAGRAM

1.3 AUTOMATIC ADJUSTMENT FUNCTIONS

This system uses a pre-amp (UPD2572GS) and servo LSI (UPD63702GF) to automate all circuit adjustment. All adjustments are carried out automatically each time a disc is inserted or the CD mode is selected with the source key. Here is how each automatic adjustment works.

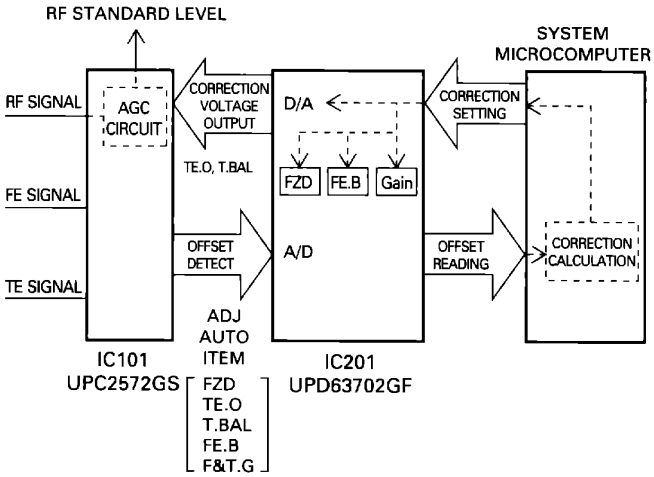


Fig.18 : AUTOMATIC GAIN CONTROL

1) FZD Cancel Setting

This setting is to make the focus closing reliable. When the power is switched on, the FE offset level is read and a voltage opposite to this offset value is written to the CRAM in the IC to cancel the offset. In this way, the FZD threshold level can be set to a constant value (+150mV) and one of the conditions within the IC for focus closing "that the FZD signal is latched at high" can be fulfilled reliably.

2) TE Offset Automatic Adjustment

This function adjusts the pre-amp TE amp offset to 0 V when the power is switched on.

The adjustment procedure is:

(1) The TE offset (LD off) is read by the microcomputer via the servo LSI (offset = TE1).

(2) The microcomputer calculates the voltage to be corrected from the value of TE1 and sets the output of Pin 65 of the servo LSI (signal name: TOFST). The concrete calculation method is as follows.

TOFST2 = TOFST1 + TE1 × R110/R109

3) Tracking Balance Automatic Adjustment

This adjustment equalizes the difference in sensitivity of the E channel and F channel of the TE output. In actual practice, the TE waveform is adjusted to be vertically symmetrical about REFO.

The adjustment procedure is:

(1) After focus closing, the lens is kicked in the radial direction to reliably generate the TE waveform.

(2) At this time, the microcomputer reads the peak and bottom of the TE waveform through the servo LSI.

(3) The microcomputer calculates the value of the offset and the correction voltage to output from Pin 66 of the servo LSI (signal name: TBAL).

(4) The voltage output from the servo LSI is input to Pin 37 of the pre-amp (IC101: UPC2572). This pin is the TEVCA amp control voltage pin. The gain for the E channel and F channel within the pre-amp is varied according to the input voltage to adjust the tracking balance and make the TE waveform vertically symmetrical about REFO.

4) FE Bias Automatic Adjustment

This adjustment is made to maximize the RFI level during play by optimizing the focus point. This adjustment utilizes the phase difference between the RF waveform 3T level signal and the focus error signal. Since an external interference is input into the focus loop, this adjustment uses the same timing as the auto gain control, explained below.

The adjustment procedure is:

(1) External interference is injected into the focus loop by command from the microcomputer (within the servo LSI).

(2) The RF signal 3T component level variation is detected within the pre-amp.

(3) The phase difference between the FE signal due to external interference input and the above 3T component is detected, to sense the focus deviation direction, and the result is output as a DC voltage from Pin 30 (3T-OUT) of the pre-amp.

(4) The 3T-OUT voltage is input to Pin 75 (A/D port) of the servo LSI and the microcomputer reads the 3T-OUT voltage through the servo LSI.
(5) The microcomputer calculates the required correction and adjusts the focus loop offset in the servo LSI.

In the same manner as the auto gain control, this adjustment is repeated a number of times to raise the adjustment precision.

5) Auto Gain Control (AGC)

This adjustment has already been used in the previous generation of CD modules. This function automatically adjusts the focus and tracking servo loop gain.

The adjustment procedure is:

(1) External interference is injected into the servo loop.
(2) The error signals (FE, TE) when the external interference is injected are passed through a band pass filter and the G1 and G2 signals are obtained.
(3) The microcomputer reads the G1 and G2 signals through the servo LSI.
(4) The microcomputer calculates the required correction and adjusts the loop gain within the servo LSI.

To raise the adjustment precision, the same adjustment procedure is repeated a number of times.

6) Initial Adjustment Values

All the automatic adjustments use the previous adjustment value as the initial value as long as the microcomputer power supply is not cut off (the backup is not cut off). If the backup is cut off, automatic adjustment does not start from the previous adjustment value, but rather from the default setting.

7) The Coefficient Display for Adjustment Result

The results of all automatic adjustments can be displayed and checked in test mode.

The coefficient displays for each automatic adjustment are as follows.

(1) FZD cancel, TE.OFST cancel, T.BAL, FE.bias
Reference value = 32 (A coefficient of 32 indicates that no adjustment was necessary).
The display is in units of about 40mV.
Example: FZD cancel coefficient = 35
35-32 = 3 $3 \times 40mV = 120mV$
Since the corrected value is approximately + 120mV, the FE offset before adjustment was - 120mV.

(2) Focus and tracking gain adjustment
Reference value: Focus = 13, tracking = 20
The coefficient display shows the gain derease relative to the reference value.
Example: AGC coefficient = 40
Gain = 20log (20/40) = - 6dB

1.4 POWER SUPPLY AND LOADING SECTION

The power supply within the system makes the loading motor drive power supply VM (7.6V) and 5V Reg IC power (6.9V) from VD (8.3V) supplied by the mother board. The disc detection LED drive voltage and the CD driver IC power supply use VD directly.

The microcomputer switches the CD driver and laser diode on/off with "CONT" and switches the 5V power on/off with "CD5VON". There is no particular control pin for the loading motor driver, but the "EJ" and "LOAD" input signals serve the same role.

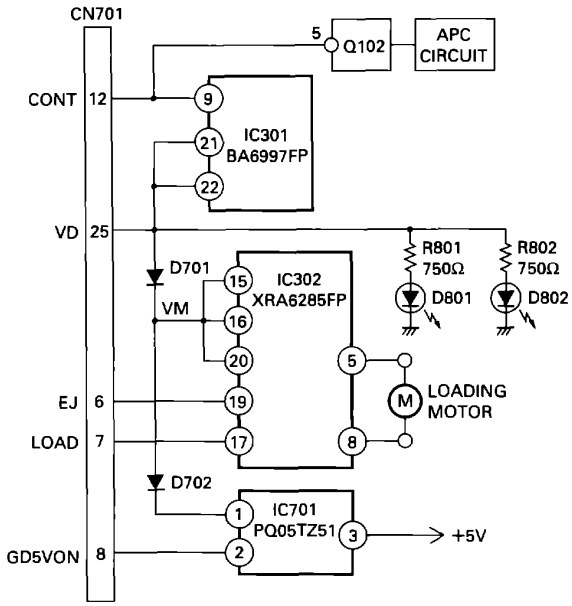


Fig.19 : POWER SUPPLY & LOADING SECTION

2. THE SUMMARY OF STRUCTURE

● Disc Loading Operations

1. There are two photo transistors before and after the rubber roller that conveys the disc. They receive light from the corresponding two LEDs. (When light is received, the photo transistor voltage is low.)
2. When a disc is inserted to just before the rubber roller, the front section photo transistor (P1) voltage goes high and the loading motor drive starts.
3. The drive power of the motor is transmitted by gear and the rubber roller rotates to transport the disc.
   The rubber roller is at one end of the loading arm and lifts up the guide arm. The guide arm is positioned by two springs. Therefore the guide arm and the rubber roller provide the appropriate pressure to feed out the disc between them.
4. The clamper arm also has a disc centering mechanism that discriminates the size of the disc and clamps the disc at the center of the spindle motor. The centering arms form a set left and right on the clamper arm and can move centering on their pivots. At the end of the centering arms are the lock arms. (The lock arms rotate about the centering pins and are locked to the clamper arm for 8cm discs.)
   For 12cm discs, the lock arms are unlocked and move to the position indicated in Figure 21.
   The detection arm, which has its center of rotation on the centering arm on the right side of the diagram, has different positions for 8cm and 12cm discs. When one of these discs is positioned on the spindle, the detection arm moves clockwise according to the external diameter of the disc and moves the detection lever to the bottom side of the figure.

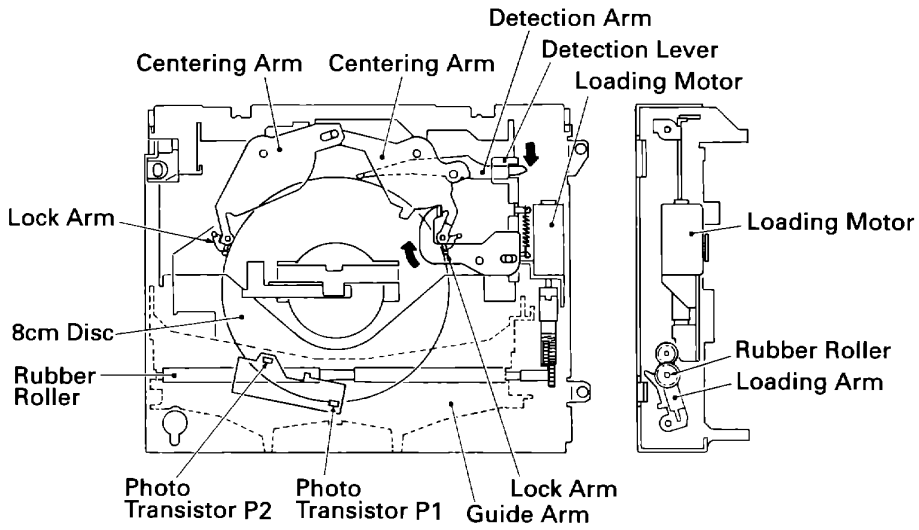


Fig.20

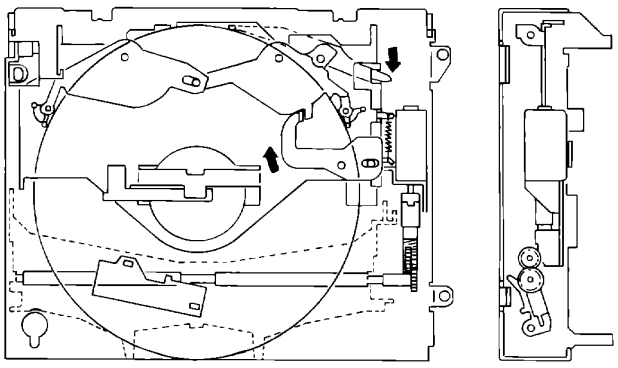


Fig.21

● Clamp Operation

The rack gear touching the detection lever meshes with the gear driven by the loading motor and rotates the L arm in the direction of the arrow in Figure 23.
The clamper arm, lifted up by the L arm, descends and clamps the disc. Also, the lock lever linked with the L arm moves the loading arm.
Because of this, the rubber roller descends, separating from the disc. At the same time the guide arm also descends. Loading ends at the position where the lock lever switches on the clamp switch.

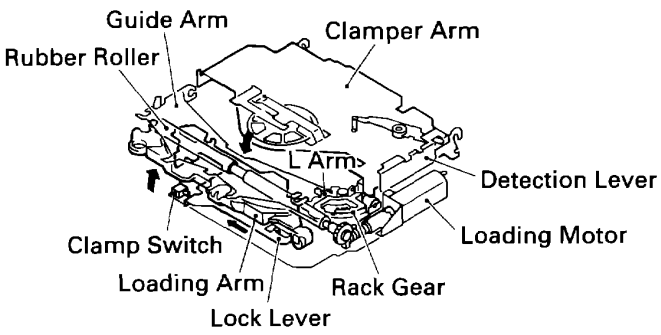


Fig.22

● Mechanism Lock Operation

1. In the eject state, both ends of the loading arm touch the bottom of the frame, the floating section front side is pushed down against the resistance of the mechanism suspension spring, and the disc insertion height position is found.
   For play, the loading arm rotates and the separation of the two ends from the frame bottom releases the floating section.

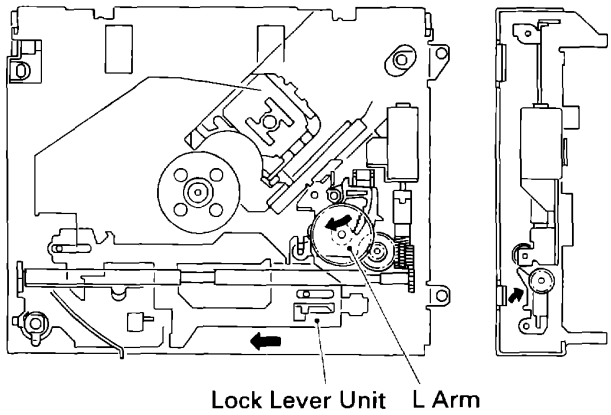


Fig.23

● Eject

1. The eject mechanism operates by reversing the rotation which takes place when the loading motor loads. The L arm moves and operates the mechanical lock, the clamp is released, the roller is applied, and the disc is conveyed. Loading stops when the photo transistor to the rear of the rubber roller (P1) is illuminated.
   However, in case of an 8cm disc, motor revolution stops a fixed period of time after P2 is illuminated. The disc type is recognized during play, by the voltage of the photo transistor (P1) located in front of the rubber rollers.

3. DISASSEMBLY AND ASSEMBLY

Remove in the order of the circled numbers in the disassembly diagram.

1. Remove the CD Mechanism Module

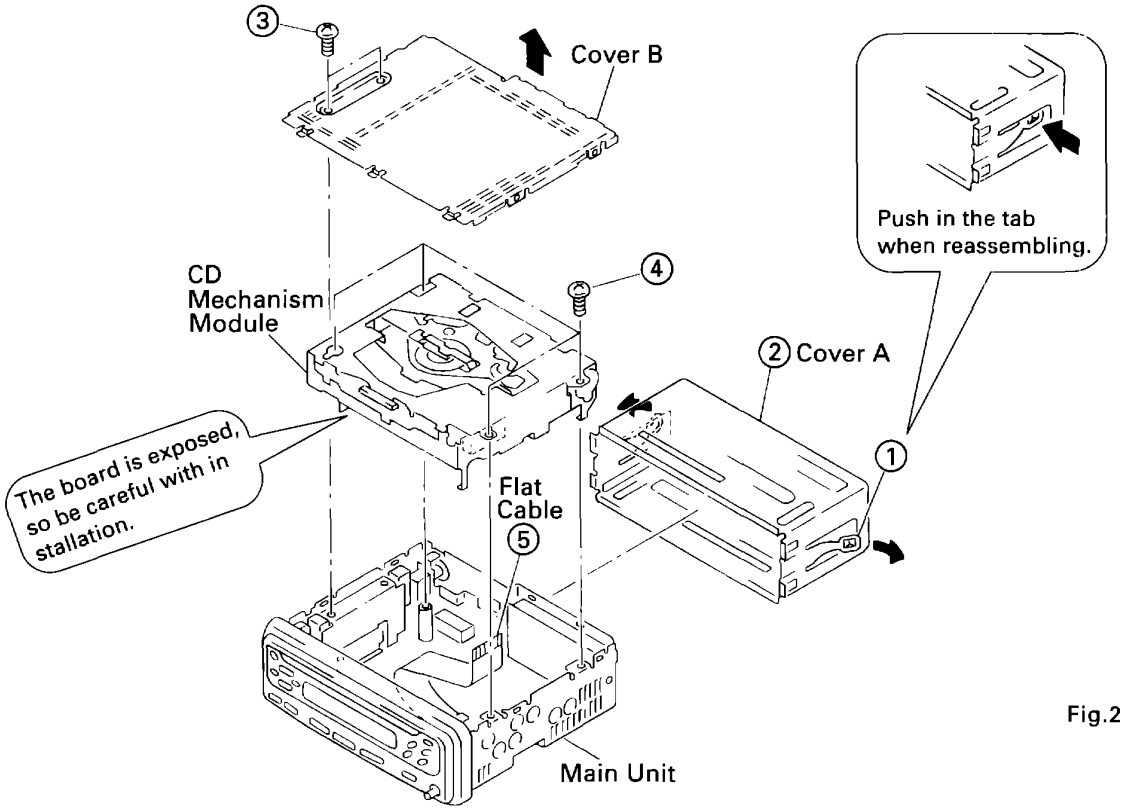


Fig.24

2. Remove the Damper and the Frame Unit

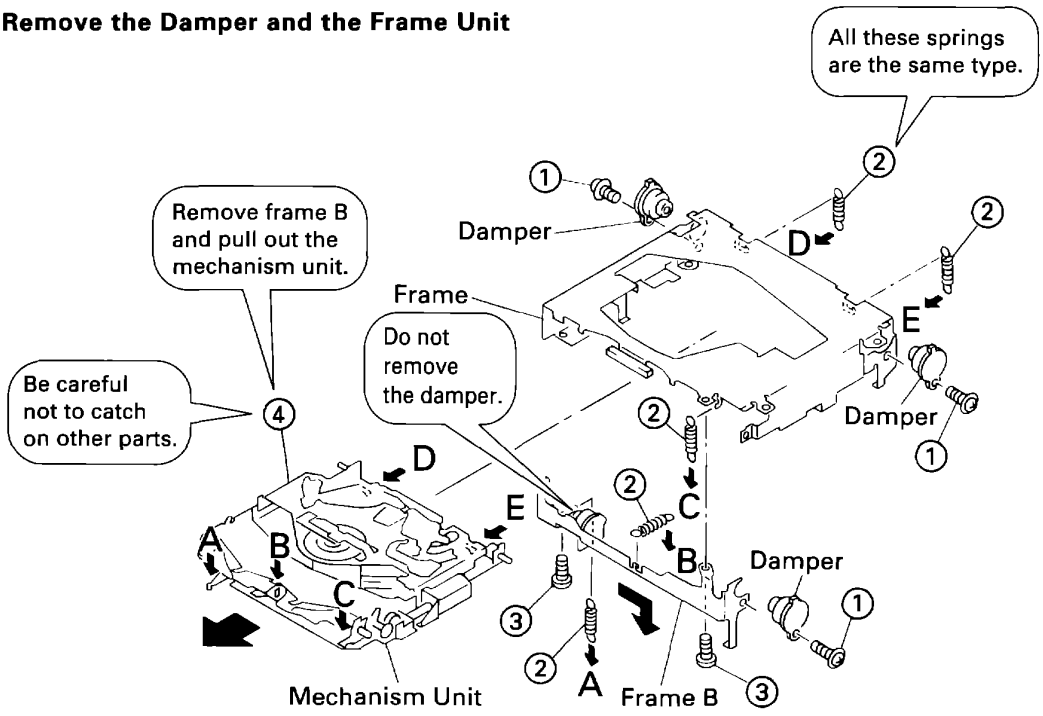


Fig.25

3. Remove the Spindle Motor

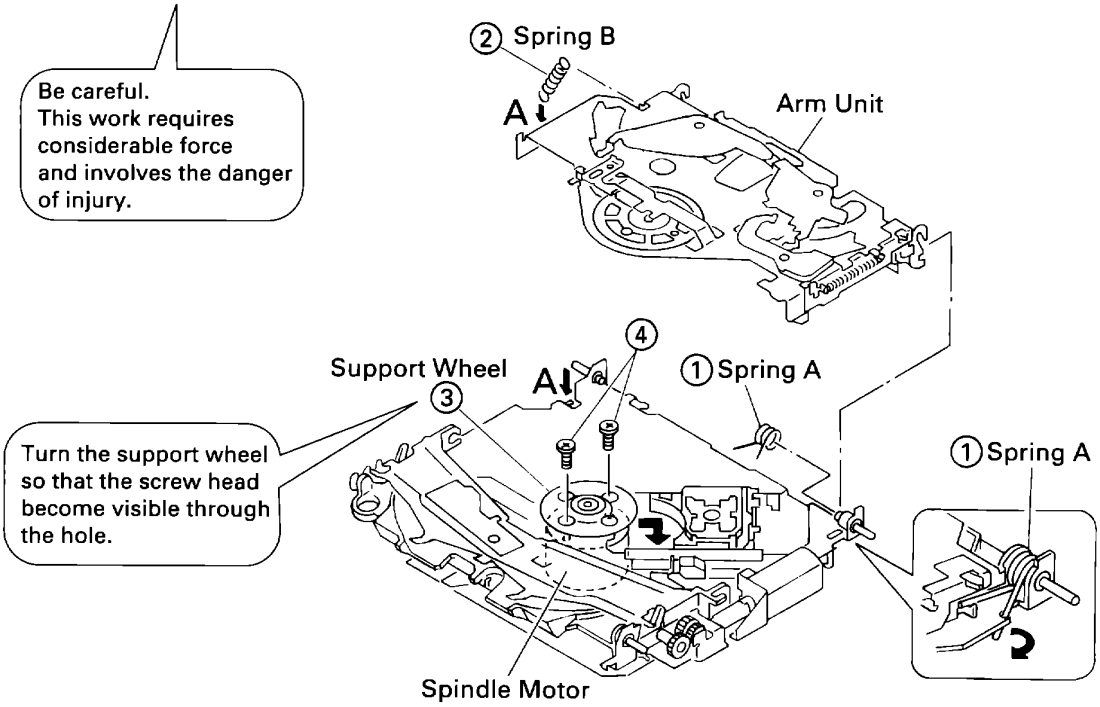


Fig.26

4. Remove the Loading Motor

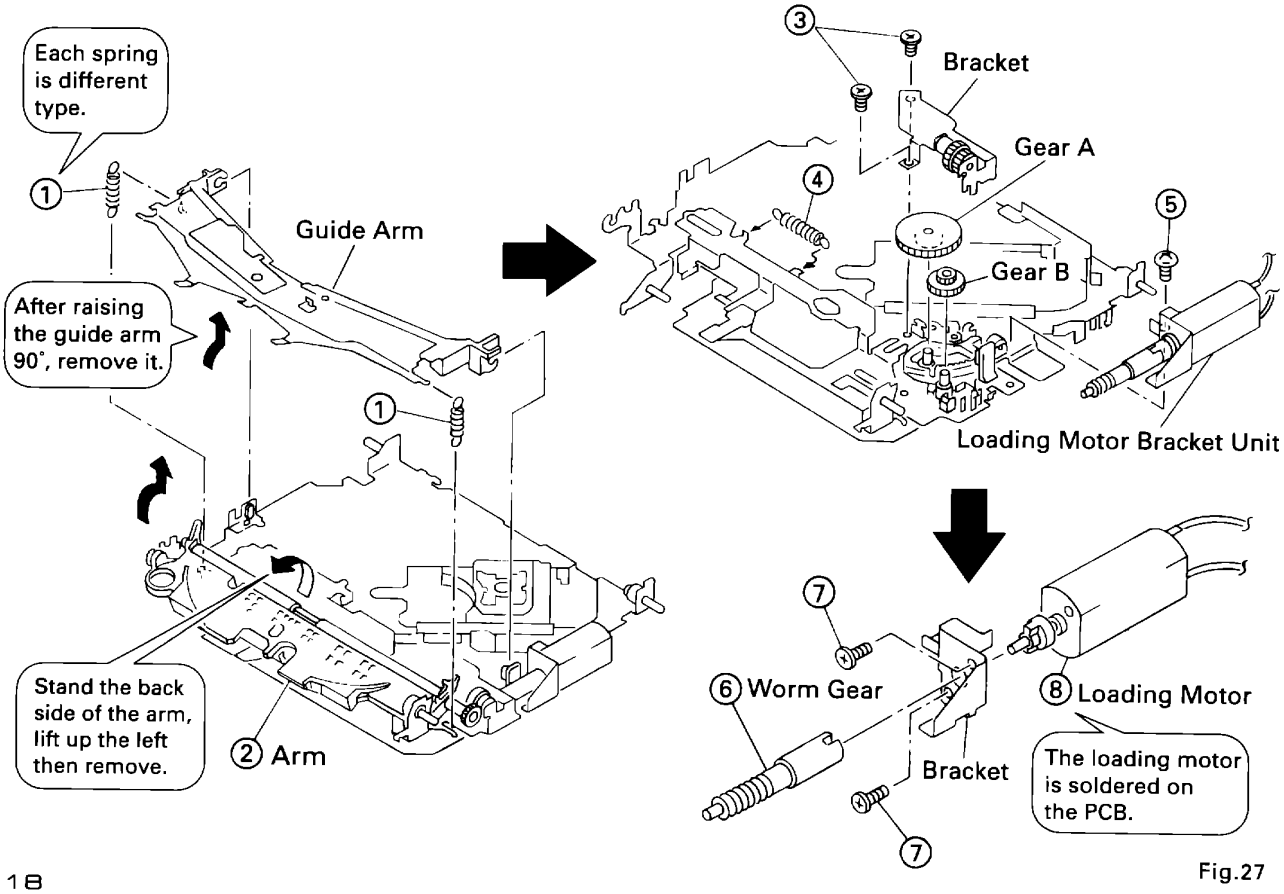


Fig.27

5. Remove the PU Unit and the Carriage Motor

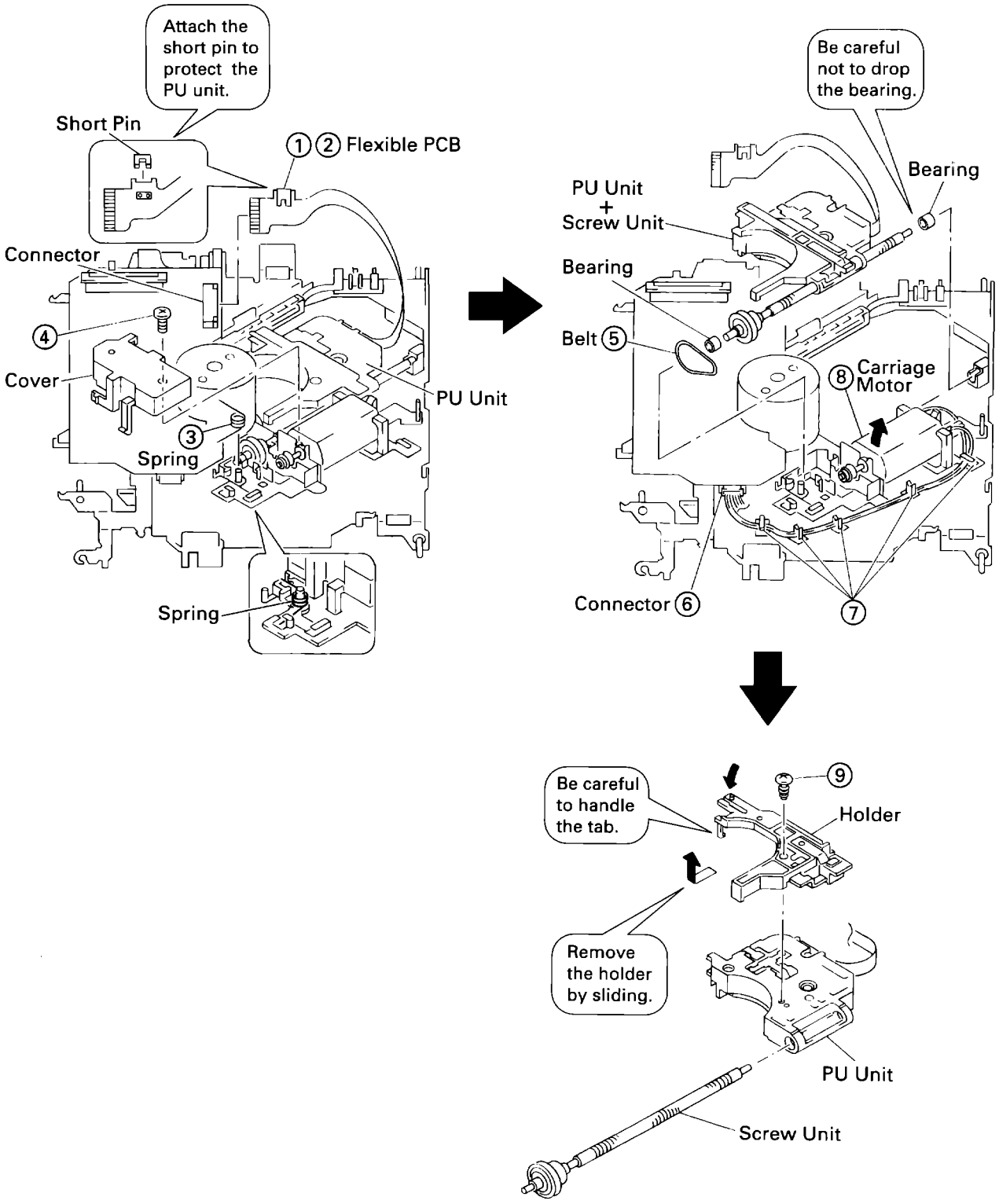


Fig.28